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# Illinois Mineral Industry in 1978

## and review of preliminary mineral production data for 1979

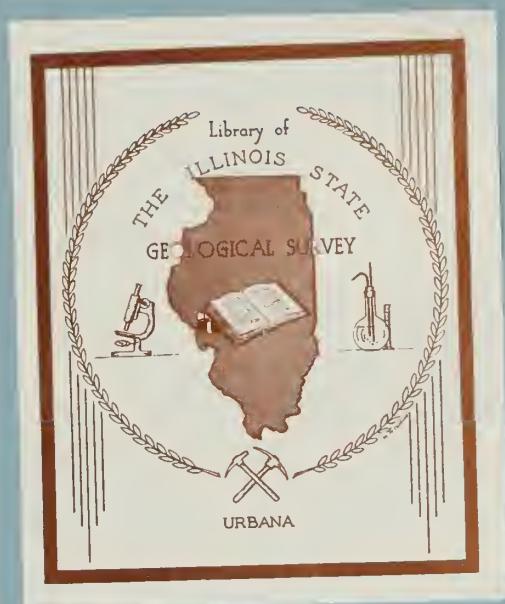
Irma Samson



Illinois Institute of Natural Resources  
STATE GEOLOGICAL SURVEY DIVISION  
Jack A. Simon, Chief

ILLINOIS MINERAL NOTES 79  
February 1981

COVER PHOTO: Bucket-wheel excavator removing unconsolidated overburden at coal mine in southern Illinois.



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ILLINOIS STATE GEOLOGICAL SURVEY



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# **Illinois Mineral Industry in 1978**

## **and review of preliminary mineral production data for 1979**

**Irma Samson**

**ILLINOIS STATE GEOLOGICAL SURVEY**  
Natural Resources Building  
615 East Peabody Drive  
Champaign, IL 61820

**ILLINOIS MINERAL NOTES 79**  
February 1981



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# Illinois Mineral Industry in 1978

## and review of preliminary mineral production data for 1979

### ■ ABSTRACT

This annual report of mineral production in Illinois in 1978 summarizes the output and value of minerals mined, and processed in Illinois, and of mineral products manufactured but not necessarily mined in Illinois. The total value of production in all three categories was \$3,170.7 million. The total value of mineral materials mined was \$1,637.0 million, with the mineral fuels—coal, crude oil, and natural gas—contributing 80.7 percent of the total value. Processed mineral materials were valued at \$1,206.9 million, and mineral products manufactured totaled \$326.8 million in 1978. Coal continued to be the leading commodity in terms of value; oil ranked second; stone and sand and gravel, used largely for construction, ranked third and fourth; and fluorspar was fifth. Illinois remained the leading U.S. producer of fluorspar, tripoli, and industrial sand, and ranked third in stone and peat, fifth in bituminous coal, sixth in total sand and gravel.

Preliminary data indicate that the value of minerals mined in 1979 reached an all time high of \$2,131.0 million, from \$1,637.0 million in 1978.

Detailed production summaries and analyses—including maps, tables, and graphs—are given for all mineral commodities.

### ■ AN OVERVIEW

There are three types of operations in the Illinois mineral industry: the removal of mineral materials from the ground by mining or other means of extraction; the processing of crude mineral materials (mined primarily outside Illinois) into basic industrial raw materials; and the manufacture of mineral products such as coke, lime, and cement from mineral materials extracted and processed primarily in Illinois (fig. 1). Table 1 gives current data on the production and value of commodities in all three categories from 1976 through 1978.

In 1978 the total value of products from the three types of operations was \$3,170.7 million, an increase of 2.5 percent over 1977. The true value is actually higher than this figure indicates, since the figure does not include the values of some commodities for which specific information is unavailable (indicated on table 1 by the symbol "NA"). Table 2 gives 1978 data on Illinois mineral production and its percentage of the total national output.

### Mineral materials mined

The value of commodities mined in Illinois in 1978 was \$1,637.0 million, which was an 8.3 percent increase over the previous record high of \$1,512.2 million in 1977 (table 1). The mineral fuels—coal, crude oil, and natural gas—accounted for 80.7 percent of the 1978 total; industrial and construction materials—clays, fluorspar, sand and gravel, stone, and tripoli—added 19.1 percent; the metals—lead, zinc, silver—along with other minerals such as peat, barite, and gemstones, made up the remaining 0.2 percent.

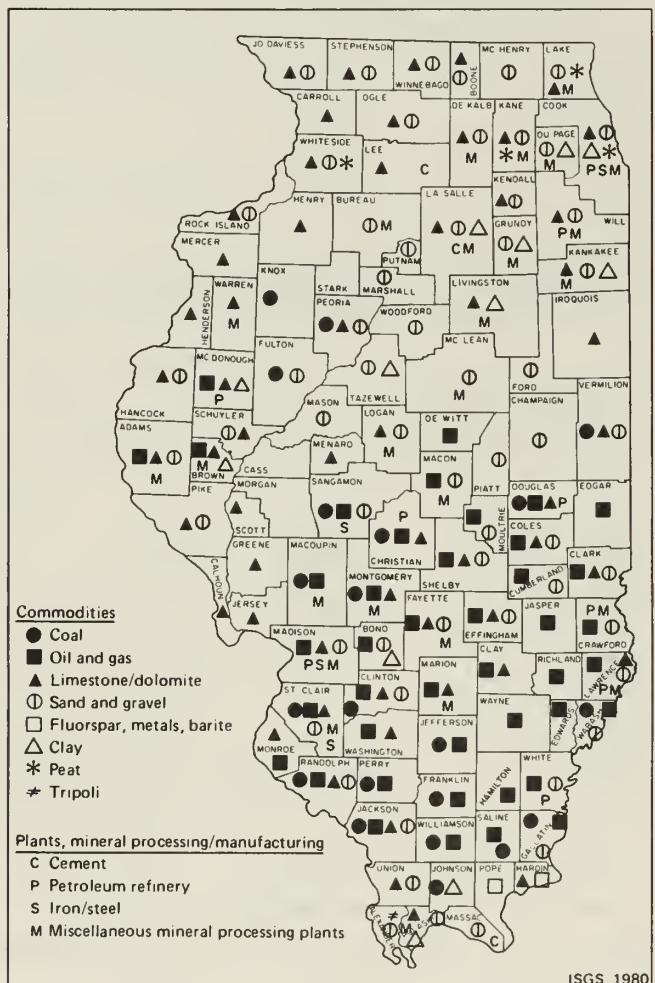


Figure 1. Illinois mineral production and mineral processing plants, by county, 1978.

TABLE 1—PRODUCTION AND VALUE OF MINERAL MATERIALS MINED AND/OR  
PROCESSED AND MINERAL PRODUCTS MANUFACTURED

Commodity	Unit	1978			1977			1976		
		Quantity	Value (\$1000)	Average unit value (\$)	Quantity	Value (\$1000)	Average unit value (\$)	Quantity	Value (\$1000)	Average unit value (\$)
MINERAL MATERIALS MINED										
<b>FUELS</b>										
Coal	thousand tons	48,744	\$ 997,305	\$ 20.46	53,880	\$ 931,054	\$ 17.28	58,136	\$ 924,365	\$ 15.90
Crude oil	thousand bbl	23,362	322,394	13.80	25,608	314,293	12.27	26,272	267,450	10.18
Natural gas	thousand Mcf	1,159	1,495	1.29	1,003	1,204	1.20	1,556	1,533	0.985
Natural gas liquids	million bbl	NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>TOTAL<sup>a</sup></b>			\$ 1,321,194			\$ 1,246,550			\$ 1,193,348	
INDUSTRIAL AND CONSTRUCTION MATERIALS										
<b>Clays</b>										
Common	thousand tons	699	2,750	3.93	914	4,790	5.24	1,258	2,890	2.30
Refractory	thousand tons	43	435	10.17	37	327	8.84	51	382	7.50
Absorbent	thousand tons	W	W	48.68	W	W	44.60	W	W	45.70
<b>Fluorspar (shipments)</b>	tons	115,859	12,452	107.48	131,218	13,941	106.24	142,666	14,563	101.37
<b>Sand and gravel</b>										
Sand and gravel	thousand tons	37,657	83,676	2.22	33,286	68,353	2.05	34,299	61,759	1.80
Sand, industrial	thousand tons	5,790	44,238	7.64	4,327	32,877	7.38	4,485	25,393	5.66
Stone (limestone and dolomite)										
Crushed and broken	thousand tons	62,453	160,353	2.57	57,074	135,964	2.38	61,858	141,441	2.29
Dimension	tons	2,600	122	40.67	2,545	109	42.79	4,108	103	25.14
Tripoli (prepared)	thousand tons	W	W	W	W	W	W	W	W	W
<b>TOTAL<sup>a</sup></b>			\$ 304,026			\$ 256,361			\$ 246,531	
METALS										
<b>Lead</b>	tons	W	W	W	W	W	W	W	W	W
Zinc	tons	W	W	W	W	W	W	W	W	W
Silver	troy ounces	W	W	W	W	W	W	W	W	W
Germanium		NA	NA	NA	NA	NA	NA	NA	NA	NA
<b>TOTAL<sup>a</sup></b>			\$ W			\$ W			\$ W	
OTHERS										
Peat (sold)	thousand tons	84	1,594	18.86	82	1,478	17.94	87	763	8.76
Gem stones		NA	15	NA	NA	2	NA	NA	2	NA
Barite, primary	thousand tons	W	W	W	W	W	W	W	W	W
<b>TOTAL<sup>a</sup></b>			\$ 1,609			\$ 1,480			\$ 765	
Values that cannot be disclosed (W)										
Total value of mineral materials mined <sup>a</sup>			\$ 1,637,030			\$ 1,512,170			\$ 1,450,997	
MINERAL MATERIALS PROCESSED										
<b>Natural gas liquids</b>	thousand bbl	NA	NA	W	W	W	W	W	W	W
Perlite, expanded	short tons	76,606	W	W	W	W	W	W	W	W
Barite, ground	short tons	W	W	W	W	W	W	W	W	2,345
Gypsum, calcined	short tons	W	W	W	W	W	W	W	W	W
Vermiculite, exfoliated	short tons	W	W	W	W	W	W	W	W	W
Iron oxide pigments	short tons	32,884	19,131	581.77	39,253	18,123	461.70	42,667	19,258	451.36
Bismuth		NA	NA	NA	NA	NA	NA	NA	NA	NA
Primary slab zinc		NA	NA	NA	NA	NA	NA	NA	NA	NA
Secondary slab zinc		NA	NA	NA	NA	NA	NA	NA	NA	NA
Columbium and tantalum		NA	NA	NA	NA	NA	NA	NA	NA	NA
Iodine, crude	pounds	W	W	W	W	W	W	W	W	W
Pig iron	thousand tons	6,925	1,157,091	167.27	6,226	1,155,931	185.66	6,429	1,119,757	174.17
Sulfur	thousand tons	202	7,867	38.95	b	b	b	b	b	b
<b>TOTAL<sup>a</sup></b>			\$ 1,196,416			\$ 1,174,054			\$ 1,141,360	
Values that cannot be disclosed (W)										
Total value of mineral materials processed <sup>a</sup>			\$ 22,813			\$ 75,453			\$ 54,510	
MINERAL PRODUCTS MANUFACTURED										
<b>Cement (shipments)</b>										
Portland	thousand tons	2,112	80,242	37.99	1,823	61,849	33.92	1,632	53,524	32.80
Masonry	thousand tons	W	W	W	W	W	W	74	4,356	58.57
Clay products, estimated		—	46,410	—	—	58,385	—	—	57,986	—
Lime	thousand tons	W	W	W	W	W	W	W	W	W
Sulfur <sup>e</sup>	long tons	—	—	—	W	W	W	W	W	W
Total value of mineral products manufactured <sup>a</sup>			\$ 1,206,902			\$ 1,249,507			\$ 1,195,870	

TABLE 1—Continued.

Commodity	Unit	1978			1977			1976		
		Quantity	Value (\$1000)	Average unit value (\$)	Quantity	Value (\$1000)	Average unit value (\$)	Quantity	Value (\$1000)	Average unit value (\$)
Coke	thousand tons	1,431	153,203	107.06	1,591	164,303	103.27	1,706	160,961	94.35
Glass		NA	NA	NA	NA	NA	NA	NA	NA	NA
TOTAL <sup>a</sup>			\$ 279,855			\$ 284,537			\$ 276,827	
Values that cannot be disclosed (W)			46,921			47,877			37,725	
Total value of mineral products manufactured <sup>a</sup>			326,776			332,414			314,552	
STATE TOTAL <sup>a</sup>			\$3,170,708			\$3,094,091			\$2,961,419	

<sup>a</sup>Data may not add up to totals shown because of independent rounding.

<sup>b</sup>Values and amounts of sulfur processed are included with total of mineral products manufactured to avoid disclosing individual company confidential data on lime for 1976 and 1977.

NA = not available.

W = withheld to avoid disclosing confidential data from individual companies.

Source: U.S. Bureau of Mines, Illinois Department of Mines and Minerals, Illinois State Geological Survey.

Extraction of mineral materials was reported by 98 of the state's 102 counties (table 3). Perry County ranked first in terms of production value, producing coal, crude oil, and stone at a total value of \$192.1 million, approximately 11.7 percent of the state total. Randolph County ranked second with a total value of \$160.4 million from coal, stone, crude oil, sand and gravel, and natural gas.

expanded perlite, sulfur, ground barite, calcined gypsum, exfoliated vermiculite, iron oxide pigments, crude iodine, bismuth, columbium, and tantalum, and both primary and secondary slab zinc. Pig iron produced in Cook and Madison Counties accounted for 95.9 percent of this total.

Illinois again led the nation in 1978 in production of expanded perlite and ranked among the top producers in output of iron oxide pigments.

## Mineral materials processed

Raw mineral materials, which came primarily from other states, were processed in 17 Illinois counties in 1978 (table 3). Included in the minerals processed (total value, \$1,206.9 million) were pig iron, natural gas liquids,

## Mineral products manufactured

Mineral products manufactured in Illinois (primarily from materials mined within the state) included coke, clay products, cement, lime, and glass. In 1978 the value of these

TABLE 2—ILLINOIS MINERAL PRODUCTION, ITS VALUE AND PERCENTAGE OF UNITED STATES MINERAL PRODUCTION, 1978

Commodity	Unit	Illinois		United States		Illinois percentage of United States production	
		Quantity	Value (\$1000)	Quantity	Value (\$1000)	Quantity	Value
Fluorspar shipments	thousand tons	116	12,452	129	13,261	89.92	93.90
Peat, commercial sales	thousand tons	84	1,590	747	12,820	11.24	12.40
Coal	thousand tons	48,744	997,305	653,800	14,645,120	7.46	6.81
Pig iron	thousand tons	6,925	1,157,091	78,284	NA	8.85	--
Stone	thousand tons	62,456	160,475	1,057,000	2,932,000	5.91	5.47
Sand and gravel	thousand tons	43,447	127,914	991,700	2,260,000	4.38	5.66
Coke	thousand tons	1,431	153,203	49,009	5,608,138	2.92	2.73
Clays <sup>a</sup>	thousand tons	742	3,185	57,107	717,818	1.30	0.44
Zinc	thousand tons	W	W	338	NA	--	--
Cement shipments (portland)	thousand tons	2,112	80,242	83,849	3,413,276	2.52	2.35
Crude oil	thousand bbl	23,362	322,394	3,178,216	28,476,815	0.74	1.13
Lead	thousand metric tons	W	W	530	NA	--	--
Natural gas liquids	thousand bbl	NA	NA	572,086	NA	--	--
Natural gas	million cu ft	1,159	1,495	19,974,033	18,084,914	0.01	0.01
Lime	thousand tons	W	W	20,451	751,779	--	--

<sup>a</sup>Excluding fuller's earth.

NA = not available.

W = withheld to avoid disclosing confidential data from individual companies.

Source: U.S. Bureau of Mines, Illinois State Geological Survey, Illinois Department of Mines and Minerals, and American Petroleum Institute.

TABLE 3—VALUE OF MINERAL MATERIALS MINED AND/OR PROCESSED AND  
MINERAL PRODUCTS MANUFACTURED IN ILLINOIS, 1978, BY COUNTY

County	Approximate <sup>a</sup> rank based on total value	Mineral materials mined, in order of value	Value (\$1000)	Mineral materials processed, in order of value	Value (\$1000)	Mineral products manufactured, in order of value	Value (\$1000)	Total value (\$1000)
Adams	39	Stone, sand & gravel, crude oil	W	Iron oxide pigments	W	—	—	8,831
Alexander	54	Tripoli, sand & gravel	W	—	—	—	—	W
Bond	74	Crude oil, sand & gravel, 1,406 clay, natural gas	—	—	—	—	—	1,406
Boone	86	Stone, sand & gravel	W	—	—	—	—	W
Brown	80	Stone, crude oil, clay	W	—	—	Clay products	W	1,168
Bureau	75	Sand & gravel	1,172	—	—	Clay products	W	W
Calhoun	94	Stone	W	—	—	—	W	W
Carroll	89	Stone	759	—	—	—	—	759
Cass	99	—	—	—	—	—	—	—
Champaign	73	Sand & gravel	1,649	—	—	—	—	1,649
Christian	35	Coal, crude oil, stone	12,314	—	—	—	—	12,314
Clark	57	Stone, crude oil, <sup>b</sup> sand & gravel	W	—	—	—	—	W
Clay	32	Crude oil, stone	W	—	—	—	—	W
Clinton	34	Coal, crude oil, stone, sand & gravel	W	—	—	—	—	W
Coles	51	Stone, crude oil, nat. gas, sand & gravel	W	—	—	—	—	W
Cook	4	Stone, sand & gravel, clay, peat	W	Pig iron, <sup>c</sup> expanded perlite, sulfur, secondary slab zinc, <sup>d</sup> bismuth <sup>e</sup>	W	Coke, <sup>c</sup> lime, clay products	W	87,803
Crawford	28	Crude oil, sand & gravel	17,497	Sulfur	W	—	—	W
Cumberland	52	Crude oil, <sup>b</sup> sand & gravel	5,309	—	—	—	—	5,309
De Kalb	66	Stone, sand & gravel	1,483	Exfoliated vermicu- lite, expanded perlite	W	—	—	W
De Witt	77	Crude oil	1,339	—	—	—	—	1,339
Douglas	14	Coal, stone, crude oil	W	Natural gas liquids	W	—	—	W
Du Page	36	Sand & gravel, stone	W	Exfoliated vermiculite	W	Clay products, glass <sup>d</sup>	W	W
Edgar	81	Crude oil	1,150	—	—	—	—	1,150
Edwards	47	Crude oil	6,168	—	—	—	—	6,168
Effingham	53	Crude oil, sand & gravel, stone	W	—	—	—	—	W
Fayette	23	Stone, crude oil, sand & gravel, nat. gas, clay	W	Sulfur	W	Clay products	W	25,681
Ford	83	Sand & gravel	1,061	—	—	—	—	1,061
Franklin	5	Coal, crude oil	85,578	—	—	—	—	85,578
Fulton	11	Coal, sand & gravel	W	—	—	—	—	W
Gallatin	21	Coal, crude oil, sand & gravel, natural gas	W	—	—	—	—	W
Greene	88	Stone	893	—	—	—	—	893
Grundy	58	Sand & gravel, clay	W	—	—	Clay products	W	3,361
Hamilton	48	Crude oil	5,637	—	—	—	W	5,637
Hancock	84	Stone, sand & gravel	W	—	—	—	—	W
Hardin	29	Fluorspar, stone, zinc, primary barite, lead, silver, gemstones, germanium	W	—	—	—	—	W
Henderson	79	Stone	1,170	—	—	—	—	1,170
Henry	70	Stone	W	—	—	—	—	W
Iroquois	93	Stone	W	—	—	—	—	W
Jackson	19	Coal, stone, sand & gravel, crude oil	W	—	—	—	—	W
Jasper	44	Crude oil	6,593	—	—	—	—	6,593
Jefferson	3	Coal, crude oil	89,898	—	—	—	—	89,898
Jersey	92	Stone	302	—	—	—	—	302
Jo Daviess	76	Sand & gravel, stone	W	—	—	—	—	W
Johnson	61	Stone, coal	W	—	—	—	—	W
Kane	24	Sand & gravel, stone <sup>e</sup>	17,714	Iron oxide pigments	W	Clay products	W	W
Kankakee	41	Stone, clay, sand & gravel	W	Sulfur	W	—	—	7,822
Kendall	71	Stone, sand & gravel	W	—	—	—	—	W
Knox	31	Coal	15,251	—	—	Clay products	—	15,251
Lake	30	Sand & gravel, neat, stone	W	Calcined gypsum, expanded perlite, crude iodine, columbium <sup>e</sup>	W	Clay products, glass, <sup>d</sup> fiberglass <sup>d</sup>	W	16,800
La Salle	6	Sand & gravel, stone, clay	46,473	—	—	Portland cement, clay products, glass <sup>d</sup>	W	79,974
Lawrence	17	Crude oil, sand & gravel, stone	36,603	Sulfur	W	—	—	W
Lee	26	Stone	3,057	—	—	Portland cement, masonry cement	W	W

TABLE 3—Continued.

County	Approximate <sup>a</sup> rank based on total value	Mineral materials mined, in order of value	Value (\$1000)	Mineral materials processed, in order of value	Value (\$1000)	Mineral products manufactured, in order of value	Value (\$1000)	Total value (\$1000)
Livingston	40	Stone, clay	7,562	—	—	Clay products	W	W
Logan	68	Sand & gravel, stone	W	—	—	Glass <sup>f</sup>	—	W
McDonough	72	Stone, crude oil, clay	W	—	—	—	—	W
McHenry	27	Sand & gravel	18,308	—	—	—	—	18,308
McLean	69	Sand & gravel	1,875	—	—	Fiberglass	W	1,875
Macon	62	Sand & gravel, crude oil	2,847	—	—	Glass <sup>f</sup>	—	2,847
Macoupin	9	Coal, crude oil	67,303	Exfoliated vermiculite	W	—	—	W
Madison	37	Stone, sand & gravel, crude oil	5,977	Pig iron, <sup>c</sup> sulfur	W <sup>c</sup>	Coke, <sup>c</sup> clay products, glass <sup>d</sup>	W	W
Marion	18	Crude oil, stone	W	Secondary slab zinc	d	Glass	—	W
Marshall	90	Sand & gravel	W	—	—	—	—	W
Mason	98	Sand & gravel	35	—	—	—	—	35
Massac	16	Sand & gravel	92	—	—	Portland cement, masonry cement	W	W
Menard	67	Stone	2,191	—	—	—	—	2,191
Mercer	100	—	—	—	—	—	—	—
Monroe	82	Stone, crude oil	W	—	—	—	—	W
Montgomery	10	Stone, coal, crude oil	53,072	—	—	Glass	—	53,072
Morgan	101	—	—	—	—	—	—	—
Moultrie	97	Crude oil, sand & gravel	W	—	—	—	—	W
Ogle	42	Stone, sand & gravel	W	—	—	—	—	W
Peoria	33	Coal, sand & gravel, stone	14,176	—	—	—	—	14,176
Perry	1	Coal, crude oil	192,108	—	—	—	—	192,108
Piatt	91	Sand & gravel	W	—	—	—	—	W
Pike	64	Stone, sand & gravel	W	—	—	—	—	W
Pope	50	Fluorspar, f lead, <sup>f</sup> zinc, <sup>f</sup> silver, <sup>f</sup> coal	256	—	—	—	—	256
Pulaski	43	Clay, stone, sand & gravel	W	—	—	Clay products	W	7,192
Putnam	96	Sand & gravel	W	—	—	—	—	W
Randolph	2	Coal, stone, crude oil, sand & gravel, natural gas	160,350	—	—	—	—	160,350
Richland	38	Crude oil	11,053	—	—	—	—	11,053
Rock Island	45	Stone, sand & gravel	W	—	—	—	—	W
St. Clair	7	Coal, stone, crude oil, natural gas, sand & gravel	W	Iron oxide pigments, primary slab zinc, ground barite	W	Glass	—	W
Saline	20	Coal, crude oil, natural gas	30,337	—	—	—	—	30,337
Sangamon	25	Coal, sand & gravel, crude oil	24,245	Iron oxide pigments	W	—	—	W
Schuyler	95	Sand & gravel, stone	W	—	—	—	—	W
Scott	87	Stone	W	—	—	—	—	W
Shelby	85	Crude oil, sand & gravel, stone	W	—	—	—	—	W
Stark	102	—	W	—	—	—	—	W
Stephenson	78	Stone, sand & gravel	1,276	—	—	—	—	1,276
Tazewell	65	Sand & gravel, clay	W	—	—	—	—	W
Union	55	Stone, sand & gravel	W	—	—	—	—	W
Vermilion	49	Stone, coal, sand & gravel	W	—	—	—	—	W
Wabash	15	Coal, crude oil, sand & gravel	40,200	—	—	—	—	40,200
Warren	46	Stone	2,476	—	—	Clay products	W	W
Washington	50	Crude oil, stone	W	—	—	—	—	W
Wayne	12	Crude oil, natural gas	46,624	—	—	—	—	46,624
White	13	Crude oil, sand & gravel	W	—	—	—	—	W
Whiteside	56	Stone, peat, sand & gravel	W	—	—	—	—	W
Will	22	Stone, sand & gravel	16,761	Expanded perlite, sulfur, crude iodine	12,492	Glass	—	29,253
Williamson	8	Coal, crude oil, natural gas	68,900	—	—	—	—	68,900
Winnebago	60	Stone, sand & gravel	3,102	—	—	—	—	3,102
Woodford	63	Sand & gravel	2,810	—	—	—	—	2,810
Undistributed		Crude oil, stone	10,550	Pig iron	1,157,091	Coke	153,203	1,320,844
Values that cannot be disclosed (W)			492,053		37,319		173,573	695,968
Total <sup>g</sup>			1,637,030		1,206,902		326,776	3,170,708

<sup>a</sup>Since some values are not available by county, county ranking cannot be exact.

<sup>b</sup>Crude oil value included with Cumberland County.

<sup>c</sup>Pig iron and coke not available by county.

<sup>d</sup>Value unknown. Not included in total.

<sup>e</sup>Including dimension stone.

<sup>f</sup>Fluorspar and metal values included in Hardin County.

<sup>g</sup>Data may not add up to totals shown because figures have been rounded.

W = withheld to avoid disclosing confidential data from individual companies.

Source: U.S. Bureau of Mines, Illinois Department of Mines and Minerals, and Illinois State Geological Survey.

products was \$326.8 million; however, in order to compare it with the figure for 1977, processed sulfur must be added, making the total \$334.6. Processed sulfur was included to avoid disclosing confidential data from individual companies. This is an increase of 0.7 percent over the \$332.4 million reported in 1977 (table 1). Coke accounted for 46.9 percent of the total value, portland cement for 24.6 percent, and clay products for 14.2 percent. No figures were available for the value of glass manufactured in Illinois.

## Employment and wages

Illinois Department of Labor data indicated that the Illinois mineral industry employed 166,000 persons in 1978. This included 26,600 in mining, quarrying, and oil and gas extraction—a 13.7 percent increase from 1977; 73,500 in mineral processing—a 3.1 percent increase from the previous year; and 65,900 in manufacturing mineral products—a 25.8 percent increase over 1977 (table 4).

The average weekly earning of workers in the mining sector of the Illinois mineral industry was \$322.26, a decrease of 12.7 percent from 1977. The average weekly earning of bituminous coal miners was \$320.69, a 21.1 percent decrease from 1977. This decrease was probably due to the nationwide coal miners' strike, during which there was no coal production in the first quarter of 1978. The Illinois Department of Labor figures do not take the strike period into account; the weekly and hourly averages are based simply on the total earnings and number of hours worked during the calendar year 1978.

## Transportation of mineral materials

A considerable part of the Illinois transportation industry is based on the shipment of mineral materials. In 1978 about 101 million tons of mineral materials were shipped by truck, and more than 44 million tons by railroad. Crushed stone accounted for approximately 56.8 percent of the tonnage shipped by truck, and sand and gravel for about 34.8 percent. About 87 percent of the railroad tonnage was composed of coal. Other materials, such as pig iron, fluor-spar, coke, and clay products, were shipped by railroad, truck, and barge. Crude oil and natural gas were transported by pipeline, and minor amounts of coal were moved to mine-mouth generating plants by conveyor belt in Christian and Montgomery Counties.

## Mineral and energy consumption

Because Illinois is a leading manufacturing state, each year it consumes a large variety of mineral materials. Data for some of the mineral materials used in Illinois during 1977 and 1978 are given in table 5.

Illinois consumption of mineral commodities is, on the average, about 5.9 percent of the total consumption of mineral commodities in the nation, which is approximately proportionate to Illinois' share of the total population of the United States.

Illinois consumed an estimated 3,788.7 trillion Btu of energy in 1978, or 4.9 percent of the total energy consumed in the United States (table 6). A large part—90.6 percent—

TABLE 4 — NUMBER OF EMPLOYEES AND AVERAGE WEEKLY EARNINGS, HOURS WORKED, AND HOURLY WAGES IN ILLINOIS MINERAL INDUSTRY, 1977 AND 1978

Class of employment	1978				1977			
	No. of employees (x 1000)	Average weekly earnings (\$)	Average no. of hours worked/week	Average hourly earnings (\$)	No. of employees (x 1000)	Average weekly earnings (\$)	Average no. of hours worked/week	Average hourly earnings (\$)
Mining	26.6	322.26 <sup>a</sup>	40.1 <sup>a</sup>	8.04 <sup>a</sup>	23.4	369.29	46.5	7.94
Bituminous coal	14.3	320.69 <sup>a</sup>	36.8 <sup>a</sup>	8.72 <sup>a</sup>	14.7	406.50	46.5	8.74
Oil and gas extraction	5.6	310.67	42.6	7.30	5.6	281.46	43.4	6.48
Other	6.7	332.55	46.2	7.20	6.0	300.45	47.6	6.31
Mineral processing								
Blast furnaces and basic steel	46.8	339.64	38.3	8.87	47.1	335.93	40.1	8.38
Primary metal industries	14.2	318.70	41.8	7.62	11.8	243.36	43.0	5.65
Petroleum refining	12.5	372.01	38.0	9.78	12.4	388.95	44.3	8.78
Mineral product manufacturing								
Glass and glass products	12.0	210.13	30.2	6.96	12.1	254.20	37.9	6.71
Cement and clay products	4.1	292.84	42.6	6.88	4.3	255.97	42.2	6.07
Stone and other mineral products	33.6	270.52	38.6	7.02	19.4	266.67	40.5	6.58
Petroleum and coal products	16.2	362.48	41.0	8.84	16.4	364.29	44.0	8.27

<sup>a</sup>During much of the first quarter of 1978 there was no coal production due to a miners' strike. The Illinois Department of Labor figures do not compensate for the strike period in the calculation of these figures for 1978.

Source: Illinois Department of Labor, Bureau of Employment Security.

came from fossil fuels. In 1977, Illinois energy consumption was estimated at 3,648.8 trillion Btu, or 4.8 percent of the U.S. total; therefore, Illinois consumed approximately 0.1 percent more energy in 1978 than in 1977.

Figure 2 shows the trends in total energy used in Illinois. Overall consumption has been increasing steadily, from 2,215 trillion Btu in 1957 to 3,788.7 trillion Btu in 1978. The use of coal has been declining while the use of natural gas and oil products has been increasing. Coal use continued to decrease in 1978, accounting for only 22.6 percent of Illinois energy consumption, as compared to 23.5 in 1977. Since 1969 the use of nuclear power has been increasing rapidly, partly replacing coal in the Illinois market. In 1978, nuclear power accounted for 9.4 percent of Illinois energy consumption.

## ■ INDIVIDUAL COMMODITIES

### Mineral materials mined

The mineral materials mined in Illinois are categorized into four groups: fuels, industrial and construction materials, metals, and other materials.

## FUELS

### Coal

**Production.** Illinois ranked fifth (behind Kentucky, West Virginia, Pennsylvania, and Wyoming) among the nation's coal-producing states in 1978. Illinois producers mined a total of 48.7 million tons of coal, valued at 997.3 million. This represents a 9.5 percent decrease in production from 1977, attributed to the nationwide coal miners' strike that began on December 6, 1977, and continued through March 24, 1978 (110 days). Nevertheless, the total value of the production in 1978 increased by 7.1 percent because the average f.o.b. mine value of coal increased from \$17.28 to \$20.46 per ton.

In 1978, 22 counties reported production of coal (fig. 3). The ten leading counties—Perry, Randolph, Jefferson, Franklin, Williamson, Macoupin, Fulton, Montgomery, St. Clair, and Douglas—contributed 82.6 percent of the total production (table 7). Surface mines operated in 14 counties; however, only in four counties (Perry, Randolph, Fulton, and Williamson) were more than 2 million tons of coal mined by the surface method. Underground mines

TABLE 5 — SELECTED MINERAL MATERIALS USED IN ILLINOIS, 1977 AND 1978

Commodity	Quantity unit	1978			1977 <sup>a</sup>		
		United States	Illinois	Illinois percentage of U.S. consumption	United States	Illinois	Illinois percentage of U.S. consumption
<b>FUELS</b>							
Coal	million tons	621.3	38.7	6.23	620.5	38.3	6.17
Coke	million tons	56.9	4.3	7.56	54.1	3.7	6.90
Distillate fuel oil	million bbl	1,257.1	61.8	4.92	1,230.2	58.5	4.76
Gasoline	million bbl	2,785.5	139.3	5.00	2,690.0	129.9	4.83
Kerosine	million bbl	64.0	1.8	2.81	64.4	1.4	2.17
Liquefied petroleum gases and ethane	million bbl	515.7	22.3	4.32	519.6	22.8	4.39
Natural gas	trillion cu ft	19.6	1.2	6.12	19.5	1.2	6.15
Residual fuel oil	million bbl	1,103.2	30.1	2.73	1,120.9	26.6	2.37
<b>METALS</b>							
Pig iron	million tons	88.4	6.9	7.81	82.0	6.2	7.56
Lead	thousand tons	1,432.7	NA	NA	1,582.3	145.4	9.19
Zinc (slab)	thousand tons	1,050.6	NA	NA	1,101.8	NA	NA
<b>CONSTRUCTION MATERIALS</b>							
Air-cooled slag	million tons	25.1	1.0	3.98	22.8	1.1	4.82
Asphalt	million tons	35.0	2.3	6.47	31.0	2.2	6.96
Cement (portland)	million tons	84.8	3.7	4.32	78.7	3.6	4.60
Road oil	million tons	0.6	0.09	14.67	0.6	0.04	6.88
Sand and gravel	million tons	991.7	43.5	4.39	929.2	37.6	4.05
Stone	million tons	1,057.0	65.1	6.16	955.4	59.6	6.24
<b>AGRICULTURAL &amp; CHEMICAL MATERIALS</b>							
Feldspar	thousand tons	735.0	46.5	6.33	734.6	37.0	5.04
Fluorspar	thousand tons	1,076.4	48.5	4.51	1,161.1	43.7	3.76
Lime <sup>b</sup>	thousand tons	21,049.0	1,159.0	5.51	20,376.0	1,031.0	5.06
Salt							
Evaporated	thousand tons	5,845.0	391.0	6.69	5,677.0	366.0	6.45
Rock	thousand tons	14,688.0	1,104.0	7.52	14,958.0	1,035.0	6.92

<sup>a</sup>Revised.

<sup>b</sup>Excludes regenerated lime.

NA = not available.

Source: U.S. Bureau of Mines.

TABLE 6 — FUELS AND ENERGY CONSUMED IN ILLINOIS, 1977 AND 1978

Fuel	Units	1978	1977	Change from 1977-1978 (%)	Trillion Btu <sup>a</sup>	
					1978 <sup>b</sup>	1977 <sup>c,d</sup>
Coal	thousand tons	38,701	38,299	+ 1.0	856.8	855.2
Natural gas	million cu ft	1,174,934	1,167,099	+ 0.7	1,197.3	1,191.6
Gasoline	thousand bbl	139,276	129,933	+ 7.2	731.6	682.5
Kerosine	thousand bbl	1,841	1,435	+28.3	10.4	8.1
Distillate fuel oil	thousand bbl	61,760	58,459	+ 5.6	359.8	340.5
Residual fuel oil	thousand bbl	30,111	26,598	+13.2	189.3	167.2
Liquid petroleum gases	thousand bbl	22,311	22,843	- 2.3	87.6	90.0
Hydropower	million kilo- watt hr	129	127	+ 1.6	1.3	1.3
Nuclear power	million kilo- watt hr	32,926	28,547	+15.3	354.6	307.4
TOTAL					3,788.7	3,643.8
Illinois percentage of United States total energy consumption					4.9	4.8
Percentage of total energy consumed in Illinois, by source:						
Coal					22.62	23.47
Natural gas					31.60	32.70
Oil products					36.39	35.36
Nuclear power					9.36	8.44
Hydropower					0.03	0.03
TOTAL					100.00	100.00

<sup>a</sup>Fuel conversion factors: gasoline—5,253,000 Btu/bbl; kerosine—5,670,000 Btu/bbl; distillate fuel oil—5,825,000 Btu/bbl; residual fuel oil—6,287,000 Btu/bbl; nuclear power—10,769 Btu/kWh; hydropower—10,435 Btu/kWh.

<sup>b</sup>Fuel conversion factors: coal—22,140,000; natural gas—1,019 Btu/Mcf; LPG—3,925,000 Btu/bbl.

<sup>c</sup>Fuel conversion factors: coal—22,330,000; natural gas—1,021 Btu/Mcf; LPG—3,941,000 Btu/bbl.

<sup>d</sup>Revised.

TABLE 7 — ILLINOIS COAL PRODUCTION, BY COUNTY, 1977 AND 1978

County	1978 Production <sup>a</sup>					1977 Production <sup>a</sup>				
	No. of mines	Underground (tons)	Surface (tons)	Total (tons)	Value <sup>b</sup>	No. of mines	Underground (tons)	Surface (tons)	Total (tons)	Value <sup>b</sup>
Christian	1 <sup>c</sup>	344,032	--	344,032	7,038,895	1 <sup>c</sup>	497,895	--	497,895	8,603,626
Clinton	1	362,305	--	362,305	7,412,760	1	99,504	--	99,504	1,719,429
Douglas	2	1,941,070	--	1,941,070	39,714,292	2	2,677,394	--	2,677,394	46,265,368
Franklin	5	3,902,283	--	3,902,283	79,840,710	4	4,750,772	--	4,750,772	82,093,340
Fulton	4	--	2,457,659	2,457,659	50,283,703	4	--	2,759,200	2,759,200	47,678,976
Gallatin	2	721,098	406,695	1,127,793	23,074,645	2	1,075,785	530,629	1,606,414	27,758,834
Jackson	2 <sup>d</sup>	--	1,494,586	1,494,586	30,579,230	5	--	1,467,700	1,467,700	25,361,856
Jefferson	4	3,620,042	327,585	3,947,627	80,768,448	4	4,333,868	434,219	4,768,087	82,392,543
Johnson	1	--	10,417	10,417	213,132	1	--	1,100	1,100	19,008
Knox	1	--	745,401	745,401	15,250,904	1	--	1,151,893	1,151,893	19,904,711
Macoupin	2 <sup>c</sup>	3,285,969	--	3,285,969	67,230,926	2 <sup>c</sup>	3,622,966	--	3,622,966	62,604,852
Montgomery	1 <sup>c</sup>	2,348,001	--	2,348,001	48,040,100	1 <sup>c</sup>	2,572,547	--	2,572,547	44,453,612
Peoria	1	--	590,726	590,726	12,086,254	1	--	917,492	917,492	15,854,262
Perry	5	--	9,380,513	9,380,513	191,925,296	5	--	9,559,010	9,559,010	165,179,693
Pope	1	--	12,519	12,519	256,139	--	--	--	--	--
Randolph	6 <sup>d</sup>	2,527,664	5,202,129	7,729,793	158,151,565	7 <sup>d</sup>	2,445,126	4,581,057	7,026,183	121,412,442
St. Clair	2 <sup>d</sup>	1,586,003	401,827	1,987,830	40,671,002	2 <sup>d</sup>	1,903,635	449,735	2,353,370	40,666,234
Saline	8 <sup>c</sup>	648,155	730,278	1,378,433	28,202,739	6	968,359	839,357	1,807,716	31,237,332
Sangamon	—	950,725	--	950,725	19,451,834	c	1,591,209	--	1,591,209	27,496,092
Stark	--	--	--	--	--	1	--	110,187	110,187	1,904,031
Vermilion	1	--	91,282	91,282	1,867,630	1	--	121,560	121,560	2,100,557
Wabash	1 <sup>d</sup>	1,365,462	--	1,365,462	27,937,353	1	1,717,690	--	1,717,690	29,681,683
Williamson	20 <sup>d</sup>	1,286,772	2,002,951	3,289,723	67,307,733	18	1,332,227	1,368,318	2,700,545	46,665,418
TOTAL	71	24,889,581	23,854,568	48,744,149	997,305,289	70	29,588,977	24,291,457	53,880,434	931,053,899
TOTAL (%)		51.1	48.9				54.9	45.1		

<sup>a</sup>Production figures from Illinois State Department of Mines and Minerals, Annual Coal, Oil and Gas Report, 1977 and 1978.

<sup>b</sup>Value calculated at an average of \$17.28 per ton for 1977 and \$20.46 for 1978.

<sup>c</sup>One mine operated at junction of Christian, Montgomery, and Sangamon Counties.

<sup>d</sup>One mine operated at junction of Jackson and Williamson Counties.

<sup>e</sup>Two mines operated at junction of Randolph and St. Clair Counties.

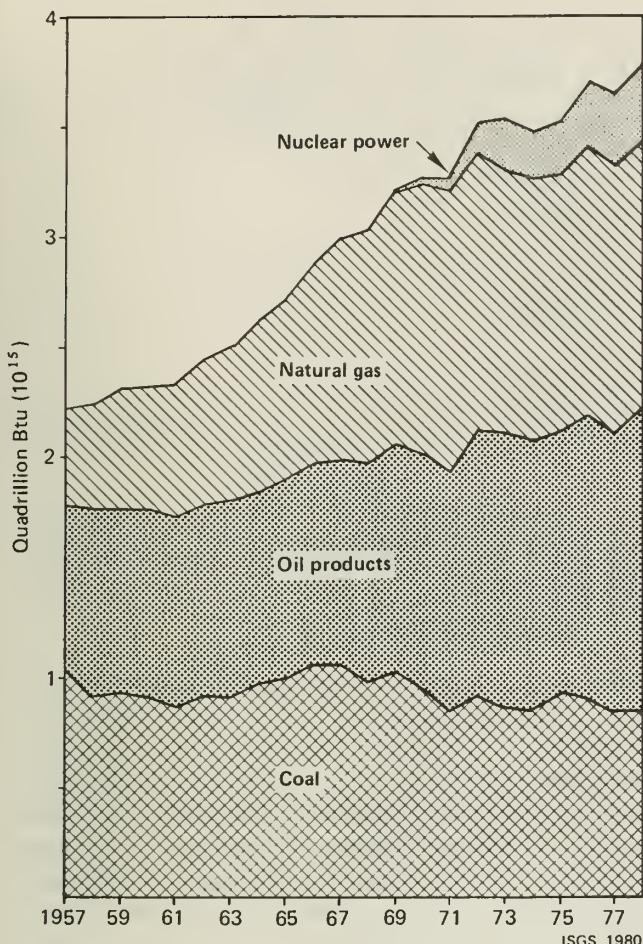


Figure 2. Total energy used in Illinois from 1957 through 1978. Contribution of hydropower is too small to show. Although nuclear power has been used since 1960, its contribution prior to 1969 was too small to show.

operated in 14 counties, but only in five of them (Franklin, Jefferson, Macoupin, Randolph, and Montgomery) were more than 2 million tons mined by this method. In Perry County, the state's leading coal-producing county, all coal was surface mined.

Since 1833 a total of 4,719.6 million tons of coal have been produced from Illinois coal mines (table 8). Of this total, 1,015.8 million tons (21.5 percent) have been surface mined since 1911.

More than 150 coal mines were operating in the early 1950s; however, that number has decreased since then. In 1978, 71 mines operated in Illinois—this was one more than in 1977. Of the 71 mines, 43 were surface mines and 28 were underground mines. The 24.9 million tons produced from the 28 underground mines represented 51.1 percent of total Illinois coal production (table 7). With the exception of the last 3 years (when strikes occurred), underground coal mine production has been gradually increasing.

In contrast, production from surface mining, while showing annual fluctuations, has generally been decreasing (fig. 4). In 1978 production from the 43 surface mines totaled 23.9 million tons, a 1.8 percent decrease from 1977 surface mine production. This is 35.8 percent below the

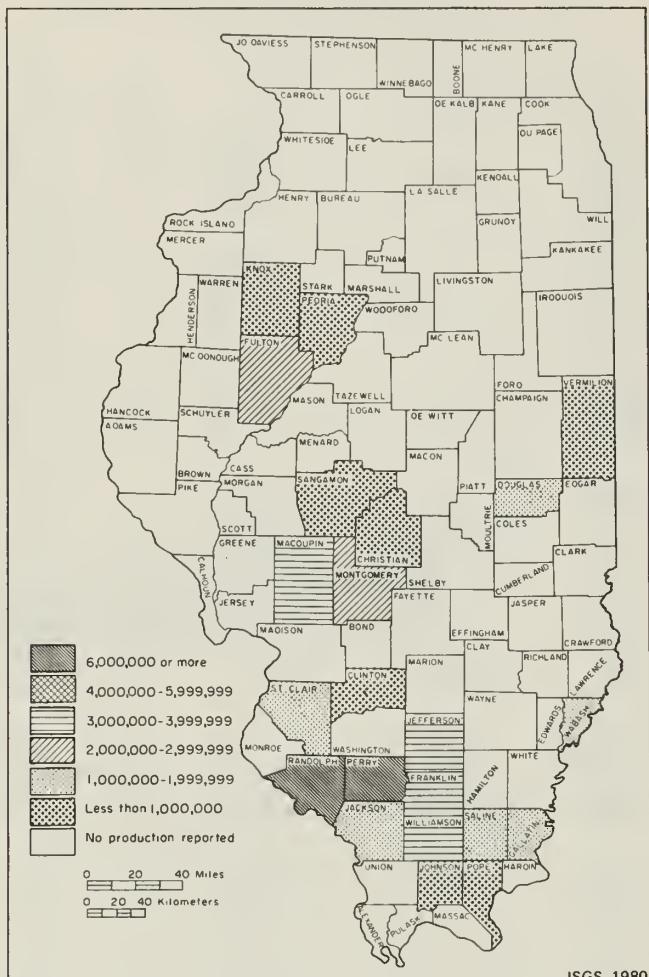


Figure 3. Illinois coal production by county in 1978. Source: Illinois Department of Mines and Minerals.

1967 peak of surface mine production in Illinois, when 44 surface operations produced 37.1 million tons of coal. The primary factors responsible for this steady decline in surface mine production in Illinois are the new, more stringent laws governing reclamation of surface mined land; the depletion of shallow coal deposits that could be surface mined easily; the rising cost of Illinois farm land; and the rapid decline of productivity of Illinois surface mines.

The average production and average number of employees per mine for both underground and surface operations are shown in table 9. Average output per underground mine in 1978 was 888,914 tons, a decrease of 24.9 percent from the 1977 output. This is the third year that output per underground mine has decreased. The average output per surface mine increased for the first time after a 5 year decline, from 539,810 tons in 1977 to 554,757 tons in 1978—an increase of 2.8 percent. In 1978 the average number of employees at underground mines decreased slightly after an increase in 1977, while the average number of employees at surface mines increased after 3 years of decline.

In 1978, 33 coal mining companies operated in Illinois. Production from each company is shown in table 10.

TABLE 8—CUMULATIVE SURFACE AND TOTAL COAL PRODUCTION  
IN ILLINOIS BY COUNTY, 1882-1978

County	Cumulative total surface production (tons)	Cumulative total production (tons)	Years active	Last year active
Adams	338,147	341,924	26	1969
Bond	--	7,355,569	57	1942
Brown	33,040	65,347	40	1963
Bureau	11,094,808	53,823,055	80	1964
Calhoun	--	96,247	27	1912
Cass	--	212,477	53	1941
Christian	--	300,333,937	94	1978
Clark	4,482	4,482	2	1955
Clay	801	801	1	1963
Clinton	--	39,118,134	81	1978
Coles	--	198,932	6	1888
Crawford	17,315	45,400	16	1961
Douglas	--	26,487,279	33	1978
Edgar	207,242	915,698	41	1952
Effingham	--	796	1	1890
Franklin	--	604,984,779	80	1978
Fulton	222,939,544	299,468,338	97	1978
Gallatin	6,868,890	27,847,809	94	1978
Greene	71,090	693,191	84	1967
Grundy	5,752,801	44,494,989	91	1973
Hamilton	--	22,097	16	1905
Hancock	459,329	771,281	72	1958
Hardin	--	40	1	1890
Henry	9,065,783	22,910,053	84	1965
Jackson	33,687,858	101,360,770	97	1978
Jasper	--	23,739	11	1939
Jefferson	5,268,072	109,845,877	75	1978
Jersey	2,290	120,350	59	1951
Johnson	72,781	314,325	62	1978
Kankakee	7,095,649	8,858,008	45	1969
Knox	61,522,148	64,817,579	94	1978
La Salle	2,345,878	65,547,638	79	1960
Livingston	139,091	10,111,437	80	1961
Logan	--	14,533,376	84	1968
Macon	--	11,000,468	65	1947
Macoupin	--	287,597,683	95	1978
McDonough	26,422	2,634,903	69	1951
McLean	--	5,544,139	47	1928
Madison	37,843	164,295,772	83	1964
Marion	--	39,247,722	82	1963
Marshall	4,779	12,516,141	70	1951
Menard	--	13,462,005	84	1965
Mercer	67,080	15,519,862	86	1973
Monroe	--	8,284	13	1941
Montgomery	--	141,999,447	97	1978
Morgan	13,564	190,787	64	1951
Moultrie	--	2,032,236	16	1924
Peoria	29,689,837	94,503,500	97	1978
Perry	230,753,421	327,832,662	97	1978
Pike	2,224	5,081	8	1942
Pope	34,704	36,266	15	1978
Putnam	--	10,071,893	29	1938
Randolph	77,072,906	156,420,882	97	1978
Richland	35	154	1	1890
Rock Island	--	3,846,169	67	1948
St. Clair	107,104,399	345,516,786	97	1978
Saline	45,944,775	250,645,667	97	1978
Sangamon	--	246,944,366	91	1978
Schuylerville	6,044,275	7,747,691	84	1966
Scott	3,790	612,476	61	1942
Shelby	925	4,119,763	67	1950
Stark	8,342,056	9,569,336	87	1977
Tazewell	--	17,633,802	75	1956
Vermilion	30,527,645	165,264,289	97	1978
Wabash	12,082	7,152,423	42	1978
Warren	132	685,466	73	1954
Washington	--	18,165,386	88	1969
White	--	1,676,741	36	1940
Will	36,405,022	44,265,271	93	1974
Williamson	76,676,014	423,933,989	97	1978
Woodford	--	7,810,160	70	1951

TABLE 8—Continued.

County	Cumulative total surface production (tons)	Cumulative total production (tons)	Years active	Last year active
Total cumulative surface production, 1911-1978		1,015,750,969		
Total cumulative production, 1882-1978		4,646,235,422		
Estimated production, all counties, 1833-1881		73,386,123		
Total cumulative production, 1833-1978		4,719,621,545		

<sup>a</sup>Source: Illinois State Department of Mines and Minerals, Annual Coal, Oil and Gas Reports.

Peabody Coal, Consolidation Coal, Freeman United Coal Mining, and AMAX Coal continued to be the four largest companies, and jointly accounted for 59.7 percent of the coal mined in the state.

**Employment and wages.** According to the Illinois Department of Mines and Minerals, 17,861 persons were working in Illinois coal mines in 1977—12,620 in underground mining operations and 5,241 in surface operations. This is a 10.8 percent increase over the 16,114 persons employed in 1977—11,375 in underground operations and 4,739 in surface operations. The number of employees per mine is higher in Illinois than in any other leading coal-producing state. Most coal output from Illinois was produced by United Mine Workers (UMW) members.

The Illinois Department of Labor reported that the average hourly wages for bituminous coal miners decreased from \$8.74 in 1977 to \$8.72 in 1978 (table 4), and that the average number of hours worked decreased from 46.5 to 36.8. Hourly wages actually increased about 25 percent, however, according to the wage contract signed March 1978 after the mine workers' strike. Earnings and work hours per week appear to have decreased because they were averaged over the year, including the strike period.

**Mine productivity.** Mine productivity is measured in tons/person-day. The number of tons/person-day represents the average amount of coal, in tons, mined by a single miner working an 8-hour shift. The average productivity of underground mines in Illinois began to decline in 1970, when the Federal Health and Safety Act of December 1969 went into effect. In 1978, productivity had decreased to 10.7 tons/person-day, the lowest level of productivity of Illinois underground mines since 1952 (and 51.9 percent below the 1969 peak level of 22.2 tons/person-day). In spite of this decrease, the productivity of Illinois underground mines was the largest in the nation.

After several years of steady decline, the average productivity level increased to 20.2 tons/person-day, which was up 5.4 percent from the level in 1977 (fig. 5). The decrease in surface mine productivity was caused

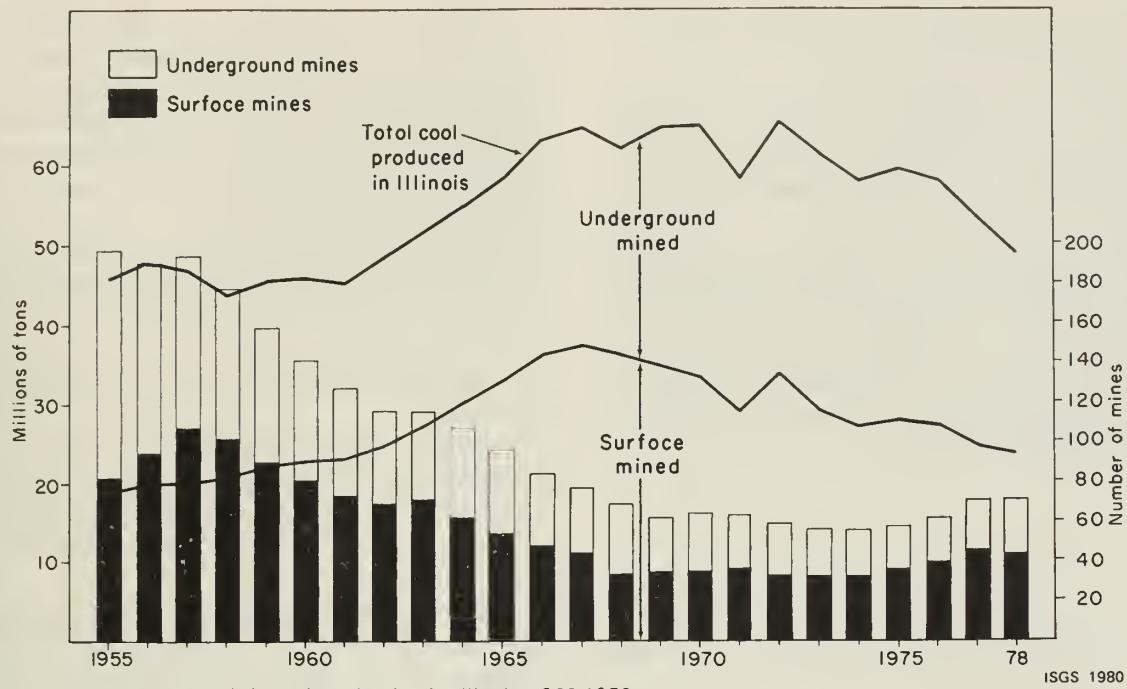


Figure 4. Trends in coal production in Illinois, 1955-1978.

ISGS 1980

partly by the increase in average thickness of overburden that had to be removed before the coal could be extracted, and partly by the fact that additional personnel were required to produce a ton of coal in compliance with the rising demand for reclamation.

**Prices.** In 1978 the average price of Illinois coal, f.o.b. mine, was \$20.46 per ton, which was 18.4 percent higher than the 1977 level. The average price, f.o.b. mine, of coal mined underground in Illinois in 1978 was \$21.60 per ton, which was \$2.33 higher than the price of surface-mined coal.

**Shipments.** Illinois coal is shipped to various parts of the United States for use by electric utilities, for manufacturing coke, and for other industrial purposes. Of the 48.4 million tons of Illinois coal shipped in 1978, including mine stock,

41.1 million tons were used by electric utilities, 2.1 million tons by coke plants manufacturing metallurgical coke, and 5.0 million tons by industrial plants. The remaining 171,000 tons were sold to retail dealers (table 11).

In 1978 about 44 percent of the Illinois coal shipped to electric utilities was consumed within the state; the remainder was shipped to surrounding midwestern states and to southeastern states. The market for Illinois utility coal continued to grow in the southeastern states of Georgia, Florida, Mississippi, and Tennessee, where electric power demands are growing rapidly and Illinois coal competes favorably with higher priced Appalachian coal. In Missouri the market for Illinois utility coal declined for the second year after many years of steady increase. In Wisconsin, Minnesota, Michigan, Iowa, and in Illinois itself, Illinois has been losing its utility market to the low-sulfur coals

TABLE 9—COAL MINES, MINING EMPLOYEES, AVERAGE PRODUCTION, AND AVERAGE NUMBER OF EMPLOYEES, BY METHOD OF MINING IN ILLINOIS, 1969-1978

Year	Underground				Surface			
	No. of mines	No. of employees	Average output per mine (tons)	Average no. of employees per mine	No. of mines	No. of employees	Average output per mine (tons)	Average no. of employees per mine
1969	28	5,944	1,077,237	212	34	3,647	1,019,411	107
1970	29	6,785	1,093,192	233	35	3,429	950,530	98
1971	27	7,088	1,090,886	262	36	3,483	804,480	97
1972	26	7,870	1,219,838	303	33	3,367	1,024,412	102
1973	24	7,794	1,357,390	325	32	3,615	905,353	113
1974	23	8,718	1,352,353	379	32	3,749	842,767	117
1975	21	9,549	1,518,099	455	36	4,097	768,304	114
1976	23	10,396	1,343,987	452	39	4,392	698,063	113
1977 <sup>a</sup>	25	11,375	1,183,559	455	45	4,739	539,810	105
1978 <sup>a</sup>	28	12,620	888,914	451	43	5,241	554,757	122

<sup>a</sup>Years of nationwide coal miners' strike.

Source: Illinois State Department of Mines and Minerals, Annual Coal, Oil and Gas Report, 1969-1978.

from western states that meet the standards for emission of sulfur oxides. The use of Illinois coal in Illinois for utilities was down 2.7 percent in 1978.

Approximately 22.7 percent of the Illinois coal shipped for coking purposes was consumed in Illinois; most of the remainder was shipped to nearby coke plants in northwestern Indiana.

Of the retail coal shipped from Illinois in 1978, 58.5 percent was consumed within the state. The rest was shipped to nearby midwestern states. Slightly less than 40 percent of the Illinois coal used for other industrial purposes in 1978 was consumed within the state. Missouri consumed 25.5 percent. Other consumers were Iowa, Indiana, Wisconsin, Minnesota, and Michigan.

*Transportation.* In 1978 Illinois coal was shipped from the mine to the consuming sector by railroad, barge, truck, and conveyor belt. At the mine sites, 38.2 million tons of coal were loaded on railroad cars for shipment; of this amount, 8.1 million tons (21.2 percent) were moved to docks for shipment by barge. The total amount of coal shipped by barge (including the 8.1 million tons shipped by rail to the barge) was 13.3 million tons. Coal shipped by truck totaled 1.8 million tons. The remaining 3.6 million tons were shipped to mine-mouth electric generating plants by conveyor belt.

Tonnage of Illinois coal handled by specific railroads in 1978 are:

TABLE 10 — ILLINOIS COAL PRODUCTION, BY COMPANY, 1978

Rank	Company	No. of mines		Production (tons)	Percentage of total production	No. of employees
		Underground	Surface			
1	Peabody Coal Company	4	4	10,494,970	21.53	3,914
2	Consolidation Coal	1	5	7,991,226	16.39	1,860
3	Freeman United Coal Mining	4	2	5,837,485	11.98	2,889
4	AMAX Coal	1	3	4,778,157	9.80	1,441
5	Southwestern Illinois Coal	0	2	4,183,273	8.58	644
6	Old Ben Coal	5	0	3,902,283	8.00	2,231
7	Zeigler Coal	5	0	3,293,531	6.76	1,468
8	Monterey Coal	2	0	2,426,515	4.98	940
9	Midland Coal	0	3	1,773,246	3.64	641
10	Inland Steel	1	0	1,475,669	3.02	706
11	Sahara Coal	2	1	1,169,062	2.40	607
12	Robertson & Associates	0	1	327,585	0.67	80
13	Morris Coal	2	0	252,149	0.52	221
14	Williamson Coal	0	1	232,833	0.48	52
15	Jader Fuel	0	2	178,135	0.37	27
16	Lee Coal	0	1	91,282		11
17	Equality Mining	0	1	89,383		19
18	J. J. Track Mining	0	1	48,851		12
19	E & B Coal	0	2	45,571		15
20	Big Ridge Coal	0	1	28,277		2
21	Crenshaw Coal	0	1	27,899		10
22	Harrisburg Coal	1	0	23,065		25
23	Arrowhead Coal	0	2	13,167	0.88	8
24	Bill V. Martin Mining	0	1	12,519		12
25	Energy Exploration	0	1	10,417		4
26	Claude White	0	1	7,747		2
27	Coldwater	0	1	6,707		3
28	H & G Coal	0	1	6,063		3
29	Oxford Construction	0	1	5,370		3
30	Riggs Mining	0	1	4,651		5
31	Malone Coal	0	1	3,611		2
32	Illinois Coal, Oil & Gas	0	1	2,500		2
33	D. D. Thomas	0	1	950		2
	TOTAL	28	43	48,744,149	100.00	17,861 <sup>a</sup>

<sup>a</sup>12,620 underground and 5,241 surface miners.

Source: Illinois State Department of Mines and Minerals, Annual Coal, Oil and Gas Report, 1978.

Railroads	Tons
Illinois Central Gulf Railroad Co.	12,496,177
Missouri Pacific Lines	8,579,912
Burlington Northern, Inc.	4,714,363
Chicago & Northwestern Transportation Co.	2,752,172
Conrail	2,205,377
Missouri & Illinois Railroad	1,837,345
Chicago & Eastern Illinois Railroad	1,220,776
Others	4,389,313
 Total coal shipped by rail	 38,195,435

Of the 13 railroads moving Illinois coal in 1978, the top three handled 67.5 percent of the total: Illinois Central Gulf, 32.7 percent; Missouri Pacific Line, 22.5 percent; Burlington Northern, 12.3 percent.

*Consumption.* In 1978, coal consumed in Illinois totaled 38.7 million tons (table 12), only 1.0 percent more than in 1977. The coal-consuming sectors included electric utilities (85.8 percent), coke and gas plants (5.5 percent), retail dealers (0.5 percent), and industrial and other users (8.2 percent).

Of the 38.7 million tons of coal used in Illinois in 1978, 20.5 million tons, or 53.0 percent, were produced

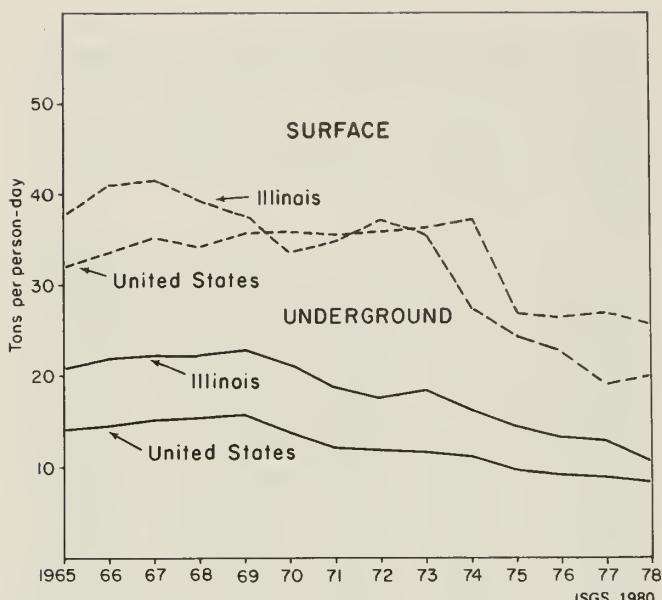


Figure 5. Trends in coal mine productivity, 1965-1978.

from mines within the state. The amount of Illinois coal used within the state decreased by 5.8 percent—from 21,767 tons in 1977 to 20,509 tons in 1978—whereas the use of coal from western states, primarily Colorado,

TABLE 11—ILLINOIS COAL SHIPMENTS, BY STATE DESTINATION AND CONSUMING SECTOR, 1974-1978 (1000 tons)

Consuming sector	Wisconsin	Minnesota & Michigan	Iowa	Missouri	Indiana	Kentucky	Georgia & Florida	Other states <sup>a</sup>	Exports <sup>b</sup> and miscellaneous	Illinois	Total
<b>Electric utilities</b>											
1974	4,134	1,992	2,304	9,148	3,028 <sup>c</sup>	2,006	1,015	1,394	7	21,828	46,856
1975	4,595	2,013 <sup>c</sup>	2,290	10,496	3,081 <sup>c</sup>	1,982	987	1,834	--	22,006	49,284
1976	4,129	1,967 <sup>c</sup>	2,090	12,084	3,261	1,487	1,525	993	--	21,414	48,950
1977	3,839	1,863 <sup>c</sup>	1,865	11,822	3,791	997	1,440	1,056	--	18,432	45,105
1978	3,536	1,465	1,660	9,708	3,330	335	1,874	1,288	12	17,934	41,142
<b>Coke and gas plants</b>											
1974	--	--	--	--	3,361 <sup>c</sup>	--	--	--	237	1,054	4,652
1975	--	--	--	--	2,959 <sup>c</sup>	--	--	--	229	1,081	4,269
1976	--	--	--	--	2,536	--	--	--	43	982	3,561
1977	--	--	--	--	2,039	--	--	73	--	862	2,974
1978	--	--	--	--	1,615	--	--	40	--	486	2,141
<b>Retail dealers</b>											
1974	4	6	16	136	20	--	--	--	9	291	482
1975	1	--	7	100	14	--	--	--	12	196	330
1976	--	--	14	102	7	--	--	--	13	324	460
1977	1	4 <sup>c</sup>	7	43	8	--	--	1	17	175	256
1978	19	4	13	20	3	--	--	--	12	100	171
<b>All others</b>											
1974	556	491	867	1,464	513	--	--	23	29	3,193	7,113
1975	514	315 <sup>c</sup>	720	1,458	219	--	--	9	8	2,761	6,004
1976	534	265 <sup>c</sup>	735	1,486	276	--	--	--	7	2,252	5,555
1977	600	270 <sup>c</sup>	755	1,540	570	--	--	3	1	2,298	5,035
1978	439	185	541	1,272	492	--	--	71	46	1,989	4,989
<b>Totals</b>											
1974	4,694	2,489	3,187	10,748	6,922	2,006	1,015	1,394	282	26,366	59,085
1975	5,110	2,328	3,017	12,054	6,273	1,982	987	1,843	249	26,044	60,029
1976	4,663	2,232	2,839	13,672	6,080	1,487	1,525	993	63	24,972	58,526
1977	4,440	2,137	2,627	13,405	6,408	997	1,440	1,133	18	21,767	54,372
1978	3,994	1,654	2,214	11,000	5,440	335	1,874	1,399	70	20,509	48,489

<sup>a</sup> Includes AL (1974-1978), MS (1974-1978), TN (1974-1978), OH, LA (1977-1978), ND (1974), WA, and PA (1977)

**b** Primarily to Mexico and Canada

<sup>c</sup>Estimated

Savanna II

Source: U.S. Bureau of Mines Bituminous Coal and Lignite Distribution Quarterly, 1974-1978

Montana, Utah, and Wyoming, continues to increase (up 13.9 percent from 1977). The amount of coal shipped to Illinois from these western states has been rapidly increasing since 1971, when extensive development of western coal fields began and the Federal Health and Safety Act went into effect. The increase from 1971 to 1978 was 268.1 percent.

Although Indiana, Kentucky, and West Virginia shipped coal into Illinois for use by electric utilities (table 12), about 37.9 percent of the total 33.2 million tons consumed by Illinois electric utilities in 1978 came from western states. In 1978 electric utilities in Illinois paid an average \$1.54 per million Btu for Wyoming coal, \$1.61 per million Btu for Colorado coal, and \$1.42 for Montana coal, as compared to \$1.02 per million Btu for Illinois coal. Nevertheless, the use of western coal by Illinois electric utilities is increasing and is expected to continue until dependable, economically feasible methods are developed for removing sulfur from Illinois coal. The installation of scrubbers and the removal of 70 to 90 percent of the sulfur are mandated in all new coal-burning units constructed after September 18, 1978, under the June 1979 New Source Performance Standards of the Clean Air Act; however, the dependability of

scrubbers for sustained periods must be improved for satisfactory application.

Of the coal used at coke and gas plants in Illinois in 1978, 22.8 percent came from Illinois mines; 64.1 percent from mines in southern West Virginia, Virginia, and eastern Kentucky; 7.5 percent from western interior states; and 5.7 percent from eastern Pennsylvania, Maryland, and northern West Virginia.

The amount of coal used in 1978 for industrial and other purposes in Illinois decreased 9.4 percent from 1977 (table 12). Illinois supplied 62.9 percent of the 3.2 million tons of coal consumed in Illinois industrial use. Other principal regions supplying coal for Illinois industrial use were: the western states (20.6 percent); West Virginia, Virginia, and eastern Kentucky (9 percent); Indiana (5 percent); and western Kentucky (2.5 percent).

Sales of coal by retail dealers continued to decline in 1978. Since 1970, these sales have gone down 91.9 percent. Of the total 209,000 tons of Illinois retail coal, Illinois mines supplied 47.4 percent; western and western interior states, 26.3 percent; southern West Virginia, Virginia and eastern Kentucky, 25.4 percent; and western Kentucky, 0.9 percent.

TABLE 12—SHIPMENT OF COAL FOR CONSUMPTION IN ILLINOIS,  
BY AREA OF ORIGIN AND CONSUMING SECTOR, 1974-1978  
(1000 tons)

Consuming sector	Illinois	Western Kentucky	Indiana	Ohio, eastern Pennsylvania, <sup>a</sup> and northern West Virginia	Southern West Virginia, <sup>b</sup> and eastern Kentucky	Western Interior <sup>c</sup> states	Western states <sup>d</sup>	Montana and Washington <sup>e</sup>	Total coal consumed in Illinois
<b>Electric utilities</b>									
1974	21,828	1,115	367	—	96	— <sup>f</sup>	1,351 <sup>f</sup>	6,080 <sup>f</sup>	30,837
1975	22,006	844	371	— <sup>f</sup>	174	90 <sup>f</sup>	1,906 <sup>f</sup>	9,462	34,853
1976	21,414	1,330	477	2 <sup>f</sup>	559	100 <sup>f</sup>	2,370 <sup>f</sup>	8,759	35,011
1977	18,432	1,185	459	39 <sup>f</sup>	995	105 <sup>f</sup>	4,651 <sup>f</sup>	6,166	32,032
1978	17,934	725	674	86	1,207	26	6,904	5,639	33,195
<b>Coke &amp; gas plants</b>									
1974	1,054	—	—	56	1,990	— <sup>f</sup>	— <sup>f</sup>	—	3,100
1975	1,081	—	—	40	1,776	64 <sup>f</sup>	133 <sup>f</sup>	—	3,094
1976	982	—	—	35 <sup>f</sup>	1,541	47 <sup>f</sup>	130 <sup>f</sup>	—	2,735
1977	862	—	—	47 <sup>f</sup>	1,288	87 <sup>f</sup>	147 <sup>f</sup>	—	2,431
1978	486	—	—	121	1,365	159	—	—	2,131
<b>Retail dealers</b>									
1974	291	3	—	—	419	3 <sup>f</sup>	56 <sup>f</sup>	—	772
1975	196	2	—	—	253	41 <sup>f</sup>	15 <sup>f</sup>	—	507
1976	324	3	—	2 <sup>f</sup>	191	7 <sup>f</sup>	10 <sup>f</sup>	—	537
1977	175	2	—	40 <sup>f</sup>	103	6 <sup>f</sup>	18 <sup>f</sup>	—	344
1978	100	2	—	—	53	3	52	—	210
<b>All others</b>									
1974	3,193	151	126	5	592	86 <sup>f</sup>	185 <sup>f</sup>	7 <sup>f</sup>	4,345
1975	2,761	55	15	3 <sup>f</sup>	481	40 <sup>f</sup>	135 <sup>f</sup>	4	3,494
1976	2,252	48	—	2 <sup>f</sup>	408	67 <sup>f</sup>	395 <sup>f</sup>	—	3,172
1977	2,298	56	62	70	443	78 <sup>f</sup>	485 <sup>f</sup>	—	3,492
1978	1,989	80	157	—	286	186	466	—	3,164
<b>Total</b>									
1974	26,366	1,269	493	61	3,097	89	1,592	6,087	39,054
1975	26,044	901	386	43	2,684	235	2,189	9,466	41,948
1976	24,972	1,381	477	41	2,699	221	2,905	8,759	41,455
1977	21,767	1,243	521	196	2,829	276	5,301	6,166	38,299
1978	20,509	807	831	207	2,911	374	7,422	5,639	38,700

<sup>a</sup>Includes Districts 1, 3, 4, and 6 (Md, OH, eastern PA, northern WV).

<sup>b</sup>Includes Districts 7, 8, and 13 (AL, GA, eastern KY, NC, TN, VA, southern WV).

<sup>c</sup>Includes Districts 14 and 15 (AR, KS, MO, OK, TX).

<sup>d</sup>Includes Districts 16, 17, 19-21 (CO, ID, ND, NM, SD, UT, WY).

<sup>e</sup>Includes Districts 22 and 23 (AK, MT, OR, WA).

<sup>f</sup>Estimated; includes minor amounts of coal shipped to other consuming sectors.

Source: U.S. Bureau of Mines, Bituminous Coal and Lignite Distribution, Calendar Years 1974-78.

## Crude oil

**Production.** Illinois crude oil production, from 23,914 wells, totaled 23.4 million barrels in 1978—8.8 percent less (2,246,194 fewer barrels) than in 1977. Based on an average unit value of \$13.80/barrel, the production was valued at \$322.4 million (table 13). Of the 23.4 million barrels produced in 1978, 13.3 million barrels were produced by secondary recovery methods (fig. 6), with waterfloods accounting for 13.2 million barrels, or 56.3 percent of the total oil produced. Pressure maintenance projects reported 152,900 barrels, or 0.7 percent of the total oil produced.

Forty-three counties produced crude oil in 1978. The ten largest oil-producing counties contributed 75.8 percent of the state's oil production in 1978 as follows:

County	(%)	County	(%)
Wayne	14.4	Crawford	5.4
White	13.1	Clay	4.2
Lawrence	10.9	Wabash	3.7
Marion	10.2	Richland	3.4
Fayette	7.7	Jefferson	2.8

Thirteen of the 385 oil fields producing in Illinois in 1978 contributed 68.8 percent of the production (table 14). The five largest fields—Southeastern Illinois, Clay City Consolidated, Salem Consolidated, Louden, and New Harmony Consolidated—accounted for 54.3 percent of the 1978 crude oil production in Illinois.

Trends of crude oil production are shown in figure 6. Crude oil production reached a peak of 146.8 million barrels in Illinois in 1940. From 1940 to 1974, oil production by primary recovery methods declined steadily, except for slight increases in 1954 to 1956 and again in 1962. Since 1974, production by primary recovery has been slightly increasing. Illinois began producing crude oil by secondary recovery methods, primarily waterflooding, in the early 1940s. Increased waterflooding activity, in conjunction with the introduction of the hydrofac (hydraulic fracturing) method of well completion in 1954, reversed the downward trend of total oil production from 1954 through 1962.

TABLE 13—CUMULATIVE CRUDE OIL PRODUCTION IN ILLINOIS, BY COUNTY, 1888-1978

County	Cumulative production, 1888-1978 <sup>a</sup> (1000 bbl)	1978 production <sup>b</sup> (1000 bbl)	1978	
			percentage of total Illinois production	1978 value <sup>c</sup> (\$1000)
Adams	125	3	0.0	35
Bond	7,397	53	0.2	732
Brown	241	2	0.0	32
Champaign	7	—	—	—
Christian	25,989	274	1.2	3,775
Clark-				
Cumberland	91,147	344	1.5	4,750
Clay	134,160	977	4.2	13,481
Clinton	84,644	373	1.6	5,154
Coles	23,297	133	0.6	1,838
Crawford	231,474	1,268	5.4	17,497
DeWitt	3,088	97	0.4	1,339
Douglas	3,610	7	0.0	98
Edgar	3,842	80	0.3	1,102
Edwards	47,073	447	1.9	6,168
Effingham	16,715	368	1.6	5,084
Fayette	393,446	1,804	7.7	24,889
Franklin	71,673	416	1.8	5,737
Gallatin	50,982	434	1.9	5,995
Hamilton	132,749	408	1.8	5,637
Jackson	10	2	0.0	30
Jasper	51,873	478	2.0	6,593
Jefferson	83,417	662	2.8	9,130
Lawrence	395,120	2,541	10.9	35,061
Macon	993	59	0.3	820
Macoupin	263	5	0.0	72
Madison	17,451	82	0.4	1,132
Marion	411,199	2,369	10.2	32,693
McDonough-				
Hancock <sup>b</sup>	5,532	23	0.1	320
Monroe	18	11	0.1	154
Montgomery	121	1	0.0	15
Moultrie	103	2	0.0	25
Perry	822	13	0.1	183
Randolph	4,529	55	0.2	763
Richland	102,453	801	3.4	11,053
St. Clair	3,418	28	0.1	392
Saline	21,458	150	0.6	2,069
Sangamon	3,303	103	0.4	1,421
Schuylerville	1	—	—	—
Shelby	1,725	25	0.1	349
Wabash	109,331	868	3.7	11,973
Washington	31,118	382	1.6	5,276
Wayne	246,752	3,366	14.4	46,450
White	285,416	3,063	13.1	42,277
Williamson	2,294	114	0.5	1,575
Other	4,772	670	2.9	9,240
Total <sup>d</sup>	3,105,221	23,362	100.0	322,394

<sup>a</sup>1978 production includes 670 thousand barrels that could not be assigned to individual fields or counties.

<sup>b</sup>No oil production reported for Hancock County in 1971-1978.

<sup>c</sup>Value calculated at average price of \$13.80 per barrel.

<sup>d</sup>Does not add up because of independent rounding.

Source: Illinois State Geological Survey Oil and Gas Section

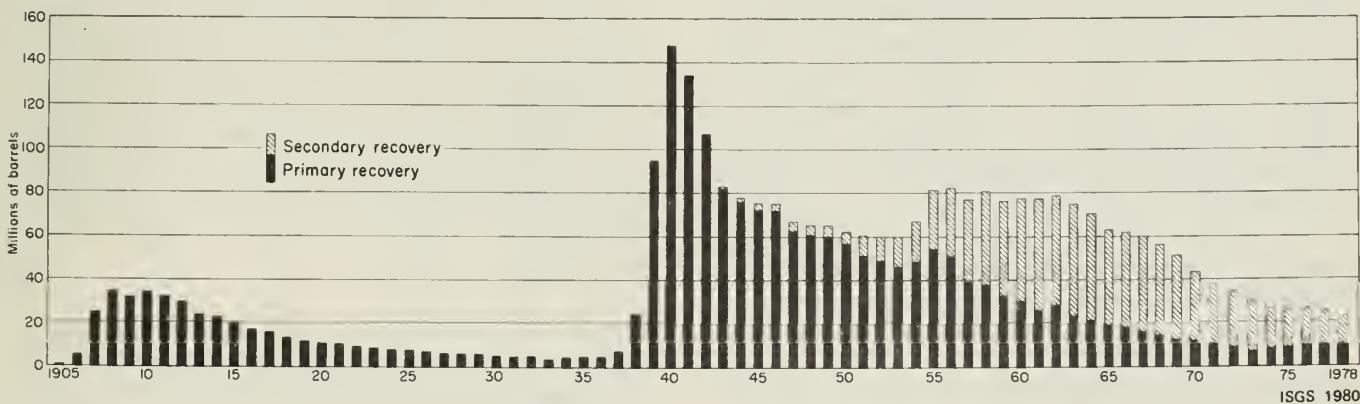


Figure 6. Annual crude oil production in Illinois, 1905-1978.

TABLE 14 — ILLINOIS CRUDE OIL PRODUCTION,  
BY MAJOR FIELD, 1978

Field	County	Crude oil production (1000 bbl)	Percentage of state total
Southeastern Illinois	Wabash		
	Lawrence		
	Crawford		
	Clark	4,191.4	17.9
	Cumberland		
Clay City Consolidated	Jasper		
	Clay		
	Wayne		
	Richland	3,129.7	13.4
Salem Consolidated	Jasper		
	Marion		
Louden	Jefferson	2,230.9	9.5
	Fayette		
New Harmony Consolidated	Effingham	1,842.7	7.9
	White		
	Wabash	1,297.9	5.6
Phillipstown Consolidated	Edwards		
	White	668.7	2.9
Keenville	Edwards	636.8	2.7
Sailor Springs Consolidated	Wayne		
	Clay		
	Jasper	559.1	2.4
Roland Consolidated	Effingham		
	White		
Johnsonville Consolidated	Gallatin	386.9	1.7
	Wayne	347.6	1.5
Springerton South	White	322.6	1.4
Dale Consolidated	Franklin		
	Hamilton		
Storm Consolidated	Saline	239.0	1.0
	White		
	White	211.5	0.9
SUBTOTAL		16,064.8	68.8
Others		7,297.1	31.2
TOTAL		23,361.9	100.00

Source: Illinois State Geological Survey Oil and Gas Section

Since that time, both primary and secondary production has declined steadily as reserves have been depleted. The extent of this depletion can be seen by comparing the January 1956 reserves figure of 700,000,000 barrels with the January 1979 figure of 132,908,000 barrels.

**Refineries.** According to the U.S. Bureau of Mines, 14 refineries were operating in Illinois in January 1, 1979, with a total capacity of 1,214,700 barrels/day—2 percent more than the capacity a year earlier.

Of the 403.9 million barrels of crude oil received at Illinois refineries in 1978, 217 million barrels came from other states and 174 million barrels came from foreign countries; the rest was of Illinois origin.

**Substitute natural gas plants.** Illinois contains 2 of the 13 plants in the nation that produce substitute natural

gas (SNG). The Northern Illinois Gas Company plant near Morris in Grundy County was the first plant to operate in Illinois. People's Gas, Light and Coke Company later opened a plant near Elwood in Will County. SNG is a small portion of total gas production; however, it supplements the natural gas supply during periods of greatest need. The combined daily capacity of these two plants is approximately 320 million cubic feet. Many of the SNG plants that were in the planning stages in various parts of the country have been cancelled or indefinitely postponed because of the Federal Energy Administration's restrictive policy regarding the allocation of petroleum feedstocks for SNG production.

**Consumption.** Table 15 shows the consumption of major petroleum products in Illinois from 1974 to 1978. In 1978, gasoline consumption in Illinois increased by 7.2 percent from 1977, and represented 5 percent of the total amount of gasoline consumed in the United States in 1978 (table 5).

Consumption of distillate fuel oil increased 5.65 percent, and consumption of residual fuel oil increased 13.21 percent.

During 1978 consumption of kerosine in Illinois increased 28.3 percent, while consumption of liquefied gases decreased 2.33 percent. The use of asphalt products in the state increased by 4.85 percent, and consumption of road oil increased by 132.8 percent.

### Natural gas

**Production.** Natural gas is produced in Illinois from gas wells and oil wells; however, only a small amount is from oil wells (table 16). This gas comes from the Keenville and Louden fields (table 17). In 1978, 1,159 million cubic feet of gas was marketed (table 16) at an average wellhead value of \$1.29/thousand cubic feet (Mcf). This was a 7.5 percent increase in value over 1977. The total value of the marketed gas is calculated to be \$1,495,000.

The amount of natural gas from Illinois fields has increased considerably in the last several years—there was a 15.6 percent increase from 1977 to 1978. In 1970, only 198 million cubic feet, valued at \$0.14 per Mcf, were marketed, as compared with 1,159 million cubic feet, valued at \$1.29 per Mcf, marketed in 1978.

As shown in table 17, natural gas is presently being recovered in 11 counties: Coles furnished 687.8 Mcf (59.3 percent of total production); Wayne, 135.0 Mcf (11.6 percent); St. Clair, 98.1 Mcf (8.5 percent); Fayette and Effingham, 65.5 Mcf (5.7 percent); Saline, 51.6 Mcf (4.5 percent); Edgar, 37.2 Mcf (3.2 percent); Gallatin, 34.2 Mcf (3.0 percent); Bond, 26.8 Mcf (2.3 percent); Williamson, 13.2 Mcf (1.1 percent); and Randolph, 9.6 Mcf (0.8 percent).

**Consumption.** In 1978, natural gas consumption in Illinois rose to 1,174.9 billion cubic feet, an increase of only 0.7 percent from the level in 1977 of 1,167.1 billion cubic feet (table 18). The 5.5 percent decline in consumption

TABLE 15 — CONSUMPTION OF MAJOR PETROLEUM PRODUCTS IN ILLINOIS, 1974-1978

Product	Unit	1978	1977	1976	1975	1974
Gasoline (excluding naphtha) <sup>a</sup>	thousand bbl	139,276	129,933	127,483	121,127	119,637
Kerosine <sup>b</sup>	thousand bbl	1,841	1,435 <sup>c</sup>	1,471	2,702	3,274
Distillate fuel oil <sup>b</sup>	thousand bbl	61,760	58,459	58,877	52,103	53,950
Residual fuel oil <sup>b</sup>	thousand bbl	30,111	26,598 <sup>c</sup>	23,659	26,948	28,521
Liquefied gases <sup>d</sup>	thousand					
Propane	gal	924,603	946,213	973,325	800,697	724,708
Butane		9,652	12,955	12,080	10,344	9,413
Butane-propane mix		2,787	229	202	189	319
TOTAL		937,042	959,397	985,607	811,230	734,440
Asphalt <sup>e</sup>	tons	2,264,356	2,159,575	1,795,978	1,830,462	1,792,502
Road oil <sup>e</sup>	tons	91,700	39,387	52,366	72,846	179,891

<sup>a</sup>Basic Petroleum Data Book, American Petroleum Institute.<sup>b</sup>U.S. Bureau of Mines Sales of Fuel Oil and Kerosine, Annual Statements, 1974-1978.<sup>c</sup>Revised.<sup>d</sup>U.S. Bureau of Mines Sales of Liquefied Petroleum Gases and Ethane, Annual Statements, 1974-1978.<sup>e</sup>U.S. Bureau of Mines Sales of Asphalt, Annual Statements, 1974-1978.

from the 1971 level (fig. 7) reflects the decreasing supply and increasing price of natural gas rather than a diminished demand. In 1978 the value of natural gas consumed in Illinois was about \$2.33 Mcf, compared with \$0.76 Mcf in 1971 (a 206.6 percent increase).

In 1978, of the total 1,174.9 billion cubic feet of gas consumed in Illinois, 98.8 percent (1,161.5 billion cubic feet) was delivered to consumers; the remaining 1.2 percent was lost in extraction, used for pipeline fuel, or burned as lease plant fuel. The consumption of natural gas by consumer class is shown in figure 7. Consumption increased in all sectors but two: industrial (down 0.9 percent) and other uses (down 30.5 percent). Electric utilities consumed 56.4 percent more natural gas in 1978 than in 1977.

TABLE 16—PRODUCTION OF NATURAL GAS  
IN ILLINOIS, 1974-1978

Year	Production (million cu ft)					
	Withdrawals		Disposition			
	From gas wells	From oil wells	Total	Marketed	Flared	
1974	1,436	— <sup>a</sup>	1,436	1,436	—	
1975	1,440	— <sup>a</sup>	1,440	1,440	—	
1976	1,556	— <sup>a</sup>	1,556	1,556	—	
1977	1,003	— <sup>a</sup>	1,003	1,003	—	
1978	958.5	200.5	1,159	1,159	—	

<sup>a</sup>Not reported separately; included under gross withdrawals from gas wells.

Source: U.S. Bureau of Mines, Minerals Yearbooks, 1974-1978 and Oil and Gas Section, ISGS.

## INDUSTRIAL AND CONSTRUCTION MATERIALS

## Clays

**Production.** The types of clay mined in Illinois include common clay, refractory or fire clay, and absorbent clay (Fuller's earth). In 1978, a total of 741,570 short tons of clay, excluding Fuller's earth, was produced in Illinois. Of this total, 94.2 percent was common clay and the rest was refractory clay. In addition, some absorbent clay

TABLE 17—PRODUCTION OF NATURAL GAS IN ILLINOIS  
BY FIELD AND COUNTY, 1977 AND 1978

Gas field	County	Production (million cu ft)		Percentage of change 1977-1978
		1978	1977	
Eldorado Consol.	Saline	—	—	4.6
Eldorado East	Saline			
	Galatin	35.3	33.4	+ 5.7
Harcos East	Saline	15.9	19.0	- 16.3
Johnston City East	Williamson	13.2	37.5	- 64.8
Mattoon	Coles	687.8	848.1	- 18.9
Raleigh	Saline	8.3	14.3	- 42.0
Stiritz	Williamson	—	6.7	-
Stubblefield South	Bond	26.8	39.8	- 32.7
Mine Gas	Saline	26.3	—	
Keenville	Wayne	135.0	—	
Louden	Fayette			
	Effingham	65.5	—	
New Athens	St. Clair	98.1	—	
Eden	Randolph	9.6	—	
Grandview-Indose	Edgar	37.2	—	
	Total <sup>a</sup>	1,159.2	1,003.4	

<sup>a</sup>Totals may not add up because of rounding.

Source: Illinois State Geological Survey Oil and Gas Section.

was produced in Illinois in 1978 (3.8 percent higher than in 1977). At an average unit value of \$3.93/ton for common clay and \$10.17/ton for refractory clay, the common clay and refractory clays produced in Illinois were valued at \$3,185,048—approximately \$1,932,761 or 37.8 percent less than in 1977.

Of the 11 Illinois counties that mined clay in 1978, the largest amount was mined in Livingston County—235,972 tons (31.8 percent). There were still 16 operations worked by 13 companies in eight counties in 1978, all producing common clay and shale. Refractory clay was mined at three mines in two counties. Two clay-mining companies worked in Pulaski County, which continued to be the only county to produce absorbent clay.

Figure 8 shows the trends in Illinois clay production. Depending on prevailing market conditions, clay production seems to fluctuate widely from year to year; since 1968, it has been declining. This trend is not due to slack demand but rather to strong competition from out-of-state production. Illinois clay production fell in 1978 to its lowest level in more than 2 decades because of increased out-of-state clay production and favorable transportation and labor costs, enabling producers (particularly those from the southern states) to erode the markets of Illinois producers.

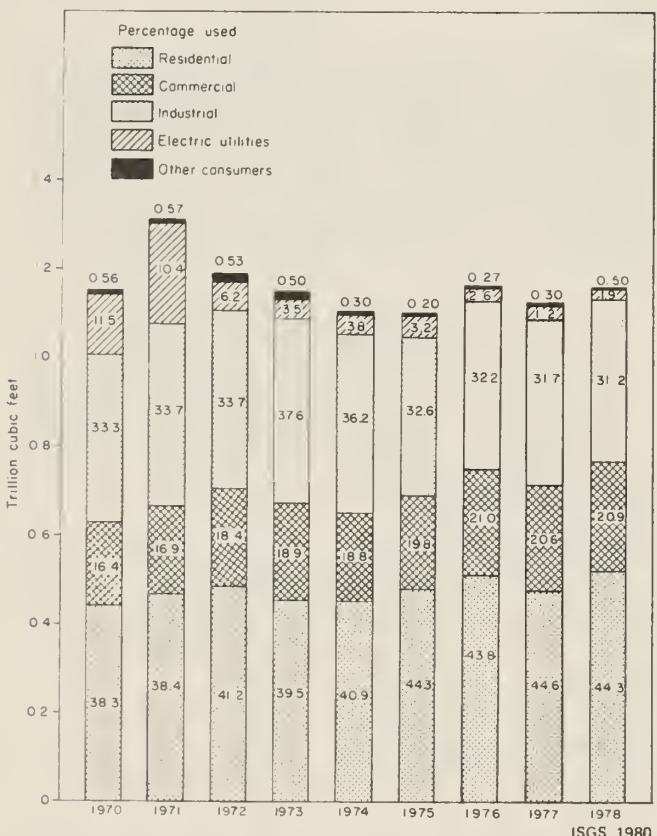


Figure 7. Consumption of natural gas in Illinois, 1970-1978.

**Consumption and uses.** The common clays and shales mined in Illinois are used principally in the manufacture of brick, sewer pipe, drain tile, cement, and lightweight aggregates. Of the 0.7 million tons of common clays produced in 1978, 405,964 tons (58.1 percent) were used in the production of building brick; 131,370 tons (18.8 percent) were used in the production of portland cement, structural concrete, concrete blocks and highway surfacing; and the remaining 161,446 tons (23.1 percent) were used in the manufacture of sewer pipe and drain tile. No production of gypsum products or terra cotta was reported in 1978.

Production of clays for common and face brick in 1978 increased 16 percent from the 1977 production level, and production of clays for use in cement and concrete products declined 69.9 percent from the 1977 level. Illinois produced 132.9 million building or common and face bricks in 1978 and shipped 124.9 million at a value of \$11.9 million.

Illinois production of refractory clay used in the manufacture of refractory brick, stoneware, and other clay products, increased from a low of 36,543 tons in 1977 to 42,790 tons in 1978. This was an increase of 17.1 percent.

Production of absorbent clay in Illinois was up 3.8 percent in quantity and 13.3 percent in value from 1977. Most of the absorbent clay produced in Illinois is used in animal litter and oil and grease absorbents.

### Fluorspar

**Production and shipments.** Illinois began producing fluorspar, the state mineral, in 1842 and has continued to do so more or less continuously since that time. Because of its easy access to water, rail, and highway transportation, the Illinois fluorspar industry has continued to be successful.

Illinois retained its position as the leading fluorspar-producing state in 1978, contributing 89.5 percent of the

TABLE 18--CONSUMPTION OF NATURAL GAS IN ILLINOIS, BY CONSUMER CLASS, 1977 and 1978

Consumer class	1978 Quantity (million cu ft)	1977 Quantity (million cu ft)	Percentage of change	Percentage of total consumption
Residential	520,525	519,973	+ 0.1	44.3
Commercial	245,723	240,520	+ 2.2	20.9
Industrial	366,548	369,727	- 0.9	31.2
Electric utilities	22,568	14,430	+ 56.4	1.9
Other consumers <sup>a</sup>	6,172	3,166	+ 94.9	0.5
Total delivered to consumers	1,161,536	1,147,816	+ 1.2	98.8
Other uses <sup>b</sup>	13,398	19,283	- 30.5	1.2
Total consumption	1,174,934	1,167,099	+ 0.7	100.0

<sup>a</sup>Includes municipalities and public authorities that use natural gas for institutional heating, street lighting, and other purposes.

<sup>b</sup>Includes lease and plant fuel, pipeline fuel, and extraction loss.

Source: U.S. Bureau of Mines.

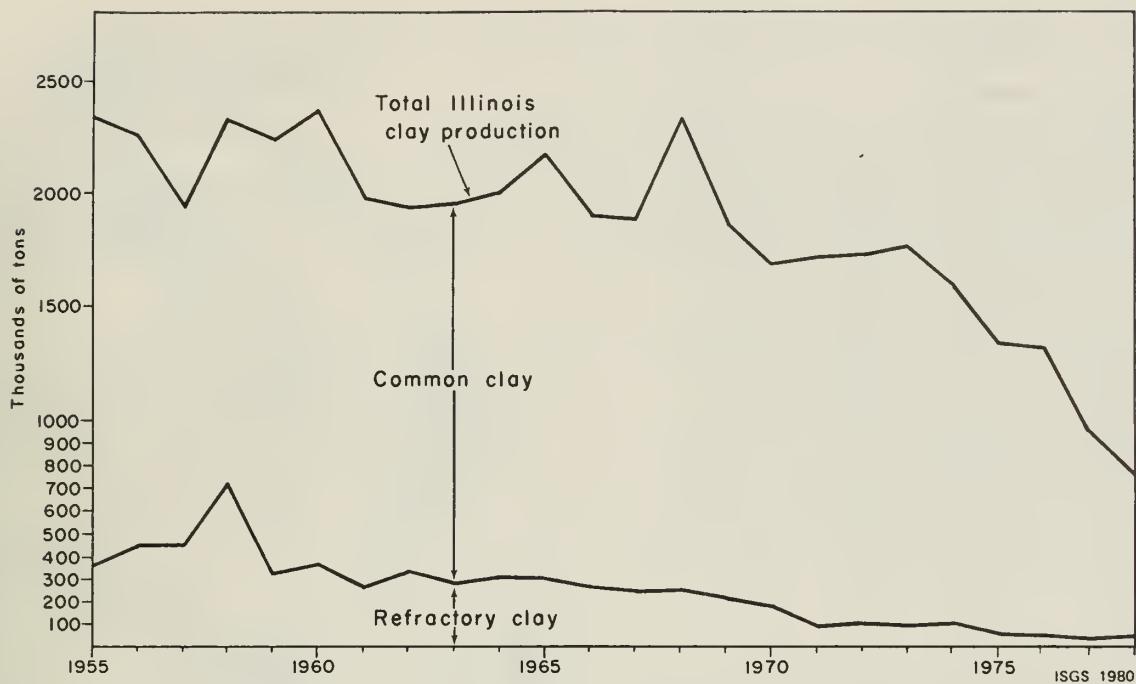


Figure 8. Trends in Illinois clay production, 1955-1978.

nation's total finished fluorspar shipments (table 19). In 1978 Illinois produced 115,859 tons of finished fluorspar. Of the total fluorspar shipped, 71,206 tons were acid grade (more than 97 percent calcium fluoride content) and 44,653 tons were metallurgical grade (less than 85 percent calcium fluoride). Included in these figures are minor amounts of ceramic grade fluorspar (85 to 96 percent calcium fluoride). Total fluorspar shipments from Illinois decreased by 11.7 percent in 1978; this decrease was due to developments in the domestic industry that had little to do with depletion of ore reserves. United States shipments of fluorspar showed a similar decrease, so that imports furnished about 85 percent of consumption.

All the fluorspar mined in Illinois in 1978 came from Hardin and Pope Counties. Fluorspar was mined or processed by three companies: Hastie Mining Company, Ozark-Mahoning Company, and the fluorspar division of Allied Chemical Company.

Hastie Mining Company continued making metallurgical gravel spar at its heavy media plant near Cave-in-Rock, Illinois, with part of its mine production coming from the Victory mine leased from Allied Chemical Company. Ozark-Mahoning's operations at Rosiclare, Illinois, operated at full capacity all year, with most of the product being used by the parent company, Pennwalt Corporation. Allied Chemical Corporation operated mines and a mill near Cave-in-Rock, Illinois, and used most of the output at its own HF plants. Some barges of imported fluorspar concentrate were unloaded at the American Minerals dock at Rosiclare, Illinois, and dried in the facilities of Allied Chemical and Ozark-Mahoning nearby.

*Consumption.* The reported consumption of fluorspar in the United States increased 3.6 percent, from 1,161,136 tons in 1977 to 1,203,448 tons in 1978. The apparent U.S. consumption (production + imports - exports ± change

TABLE 19—FLUORSPAR SHIPMENTS AND CONSUMPTION, ILLINOIS AND UNITED STATES, 1969-1978

Year	Shipments (tons)				Consumption (tons)			
	Illinois		United States	Illinois shipments as percentage of U.S. shipments	Illinois		Illinois consumption as percentage of U.S. consumption	
	Acid grade	metallurgical grade			total	total	United States <sup>a</sup>	United States <sup>a</sup>
1969	47,776	40,704	88,480	48.5	78,727	1,356,624	5.80	
1970	86,729	61,479	148,208	55.1	89,065	1,372,404	6.49	
1971	72,514	65,537	138,051	50.7	89,971	1,344,742	6.69	
1972	75,188	57,217	132,405	52.9	67,428	1,352,149	4.99	
1973	93,062	72,751	165,813	66.7	86,715	1,351,705	6.42	
1974	69,204	84,494	153,698	76.4	75,115	1,524,532	4.93	
1975	50,479	49,419	99,898	71.4	46,525	1,244,938	3.74	
1976	91,803	50,863	142,666	75.8	44,462	1,273,498	3.49	
1977	83,758	47,460	131,218	77.9	43,742	1,161,136	3.77	
1978	71,206	44,653	115,859	89.5	48,519	1,203,448	4.03	

<sup>a</sup>Fluorspar consumed includes domestic and foreign material.

Source: U.S. Bureau of Mines.

in stocks) in 1978 totaled 1,283,719 tons—a decrease of 8.6 percent over the 1977 level.

Illinois fluorspar consumption in 1978 was 48,519 tons, or about 4 percent of the total U.S. consumption. This represents a 10.9 percent increase from 1977 consumption. Illinois fluorspar is used as a flux in the production of Illinois raw steel, which totaled 12.4 million tons in 1978—up 14.3 percent from the 1977 level. The chemical industry is also a large consumer of fluorspar, using it in the production of hydrofluoric acid and, ultimately, of fluorocarbon gases and plastics, sodium and aluminum fluorides for aluminum production, and other miscellaneous chemicals having a wide variety of additional uses. The growing concern over possible damage to the atmosphere, which may be caused by fluorocarbons in aerosol sprays and refrigerants, has depressed the fluorocarbon market for the past several years and will probably continue to do so in the future.

### Sand and gravel

**Production.** Sand and gravel deposits are widely distributed throughout Illinois. The principal source of commercial sand and gravel are glacial deposits, chiefly valley trains and outwash plains. In 1978, Illinois produced 17.7 million tons of sand (excluding industrial sand), and 20.0 million tons of gravel (table 20). At a value of \$2.22 per ton, Illinois sand and gravel production was valued at \$83.7 million, an increase of 22.4 percent over the 1977 level. This increase was caused by increased production and increased value per ton.

In 1978 Illinois ranked first in the nation in the production of industrial sand and gravel, producing a total of 5.8 million tons. Production was reported in La Salle and Ogle Counties. The 1978 value of industrial sand and gravel was \$44.2 million, with a unit value of \$7.64 per ton (table 20).

In 1978, 59 counties produced sand and gravel (fig. 9), with 172 companies mining 197 deposits (as compared with 173 companies mining 197 deposits in 1977). Total sand and gravel production increased by 5,813,762 tons, or 15.4 percent, from the 1977 level (fig. 10). Although the number of sand and gravel operations has been decreasing over the past several years, the size of plants has been increasing. In 1978, 29 plants produced more than 300,000 tons each (table 21); during the mid 1960s, only 25 plants were producing more than 300,000 tons each.

**Transportation.** Sand and gravel is usually not shipped farther than 50 miles from the pit. In 1978 trucks moved approximately 80 percent of the total shipments, barges moved 3.8 percent, and trains moved 8.6 percent; 7.2 percent was undistributed and 0.2 percent was not reported (table 20).

**Consumption and uses.** Common sand and gravel produced in Illinois is used primarily in construction aggregates.

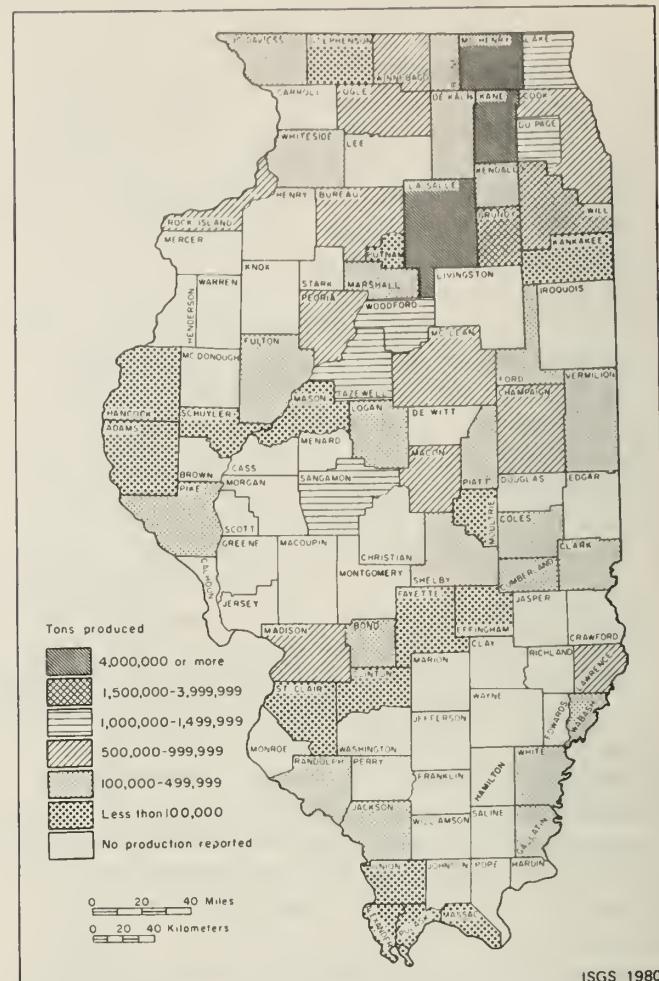


Figure 9. Illinois sand and gravel production by county, 1978.  
Source: U.S. Bureau of Mines.

Commercial, government, and contractor operations used 37.7 million tons of common sand and gravel in 1978, valued at \$83.7 million. This was an increase of 13.1 percent in quantity and 22.4 percent in value. A total of 17.0 million tons (45.2 percent) was used for building construction, 15.0 million tons (39.7 percent) for paving, and 5.7 million tons (15.1 percent) for fill and other uses (table 22).

Industrial sand produced in 1978 was sold in unground form for use in glass manufacturing; as molding, blasting, grinding, and polishing sand; as engine sand for filtration; and as sand for hydrofracturing, in oil wells. Ground sand was sold for use in chemicals, abrasives, enamels, glass, pottery, porcelain, and tile for fillers and foundry purposes.

### Stone

**Production.** In 1978, Illinois stone production (excluding dimension stone) increased to 62.5 million tons from 57.1 million tons in 1977, a 9.4 percent gain. The total value also increased to 160.4 million, with the average unit value rising from \$2.38/ton in 1977 to \$2.57/ton in 1978.

TABLE 20—SAND AND GRAVEL PRODUCED AND MODE OF TRANSPORTATION,  
BY COUNTY, 1978

County	Number of companies	Number of operations	Quantity (1000 tons)				Value (\$1000)	Mode of Shipment			Undis- tributed
			Sand	Gravel	Industrial sand	Total produced		Truck	Rail	Barge	
Adams	1	1	W	--	--	W	W	W	--	--	--
Alexander	1	1	W	W	--	W	W	W	--	--	W
Bond	4	4	141	75	--	216	486	W	--	--	W
Boone	2	2	185	W	--	W	396	W	--	--	W
Bureau	6	6	280	220	--	500	1,172	500	--	--	--
Champaign	4	5	565	143	--	708	1,649	W	--	--	W
Clark	3	4	99	312	--	411	1,016	411	--	--	--
Clinton	2	2	W	W	--	W	W	W	--	--	--
Coles	2	3	W	W	--	W	W	W	--	--	--
Cook	3	3	314	437	--	751	1,840	W	W	--	W
Cumberland	3	3	120	122	--	242	559	242	--	--	--
DeKalb	4	4	W	W	--	251	584	W	--	--	W
Du Page	3	4	225	975	--	1,200	3,032	1,200	--	--	--
Effingham	1	1	W	--	--	W	W	W	--	--	--
Fayette	1	1	20	30	--	50	75	50	--	--	--
Ford	3	5	W	W	--	420	1,061	W	--	--	W
Fulton	2	2	W	W	--	W	W	W	--	--	W
Gallatin	1	1	W	W	--	W	W	--	--	W	--
Grundy	1	1	W	--	--	W	W	--	--	W	--
Hancock	1	1	W	W	--	W	W	W	--	--	--
Jackson	1	1	W	W	--	W	W	W	--	--	--
Jo Daviess	1	1	W	W	--	W	W	W	--	--	--
Kane	8	11	1,793	4,527	--	6,320	14,000	W	--	--	W
Kankakee	2	2	23	--	--	23	35	23	--	--	--
Kendall	4	4	198	265	--	463	900	418	--	--	45
Lake	5	5	546	897	--	1,443	2,345	W	--	--	W
La Salle	11	13	W	237	W	5,496	40,055	W	W	--	W
Lawrence	3	3	W	W	--	682	1,444	682	--	--	--
Logan	3	3	191	186	--	377	788	377	--	--	--
McHenry	15	18	3,518	4,819	--	8,337	18,308	8,084	W	--	W
McLean	4	4	293	377	--	670	1,875	W	--	--	W
Macon	2	2	W	W	--	W	2,027	W	--	--	--
Madison	3	3	589	--	--	589	1,242	W	--	W	--
Marshall	1	1	W	W	--	W	W	W	--	W	--
Mason	1	1	22	--	--	22	35	22	--	--	--
Massac	2	2	W	W	--	W	92	W	--	--	--
Moultrie	1	1	W	W	--	W	W	W	--	--	--
Ogle	1	1	--	--	W	W	W	W	--	--	--
Peoria	4	4	421	249	--	670	1,281	540	30	W	W
Piatt	2	2	W	W	--	W	W	W	--	--	--
Pike	2	2	W	W	--	W	W	W	--	--	--
Pulaski	1	1	--	14	--	14	27	14	--	--	--
Putnam	1	1	W	W	--	W	W	W	--	--	--
Randolph	1	1	W	--	--	W	W	W	--	--	--
Rock Island	2	3	W	W	--	W	W	W	--	--	--
St. Clair	1	1	W	--	--	W	W	W	--	--	--
Sangamon	4	4	833	223	--	1,056	3,372	W	--	--	W
Schuylerville	1	1	W	W	--	W	W	W	--	--	--
Shelby	1	1	W	W	--	W	486	W	--	--	W
Stephenson	1	1	36	34	--	70	188	70	--	--	--
Tazewell	4	10	444 <sup>a</sup>	560 <sup>a</sup>	--	1,004	2,605	994	--	--	10
Union	1	1	--	--	--	1	1	1	--	--	--
Vermilion	4	4	33	116	--	149	239	149	--	--	--
Wabash	4	4	107	37	--	144	290	143	--	--	1
White	2	2	W	W	--	W	W	W	--	--	W
Whiteside	2	2	W	W	--	W	664	W	--	--	--
Will	9	10	703	1,257	--	1,960	4,620	1,960	--	--	--

TABLE 20—Continued.

County	Number of companies	Number of operations	Quantity (1000 tons)				Value (\$1000)	Mode of Shipment			Undis-tributed
			Sand	Gravel	Industrial sand	Total produced		Truck	Rail	Barge	
Winnebago	6	8	408	513	--	921	1,603	W	--	--	W
Woodford	4	4	306	718	-	1,024	2,810	1,024	--	--	--
Concealments			5,239	2,662	5,790	7,263	14,712	17,926	3,711	1,671	3,149
State Total	172	197	17,652	20,005	5,790	43,447	127,914	34,830	3,741	1,671	3,205

<sup>a</sup>500 tons sand and 500 tons gravel.

W = withheld included in concealments.

Source: U.S. Bureau of Mines.

Of the 62.5 million tons of crushed and broken stone produced in 1978, 40.3 million tons were limestone and 22.1 million tons were dolomite (table 23). In addition to crushed and broken stone, Illinois produced a small amount of dimension stone (stone quarried and prepared in blocks to specifications) at one quarry in Kane County. According to the U.S. Bureau of Mines, 2,600 tons of dimension stone valued at \$122,122 were produced in Illinois in 1978.

As shown in figure 11, 60 Illinois counties reported stone production in 1978 (4 less than in 1977), and 271 limestone or dolomite quarries were operating in 1978, compared to 284 in 1977. There were 160 quarries producing less than 100,000 tons of stone/year in 1978, compared to 183 quarries in 1977. The number of quarries producing between 100,000 and 500,000 tons/year increased from 75 in 1977 to 82 in 1978, and the number of quarries producing more than 500,000 tons/year increased from 26 in 1977 to 29 in 1978. Illinois stone production, according to size of operation, is shown in table 24.

**Shipments.** Most stone is shipped by truck because it is hauled only a short distance. Shipments of stone, a bulk commodity, are confined primarily to areas near the quarry. Illinois waterways are put to good use by some producers in Will and Hardin Counties. As shown in table 23, 91.2 percent (56.9 million tons) of the state's total production of 62.5 million tons was shipped by truck in 1978. Other modes of shipment included rail, 3.2 percent (2.0 million tons), and barge, 4.7 percent (2.9 million tons).

**Consumption and uses.** Stone produced in Illinois is sold for construction aggregate, for agricultural purposes, and for industrial and chemical use (fig. 12). Specific uses of stone produced in Illinois are shown in table 25.

In 1978, of the 62.5 million tons of stone produced in Illinois, 50.1 million tons (80.3 percent) were used for construction aggregate. Of the total construction aggregate, 16.9 million tons (33.7 percent) were used for road base stone, 9.0 million tons (17.9 percent) for concrete aggre-

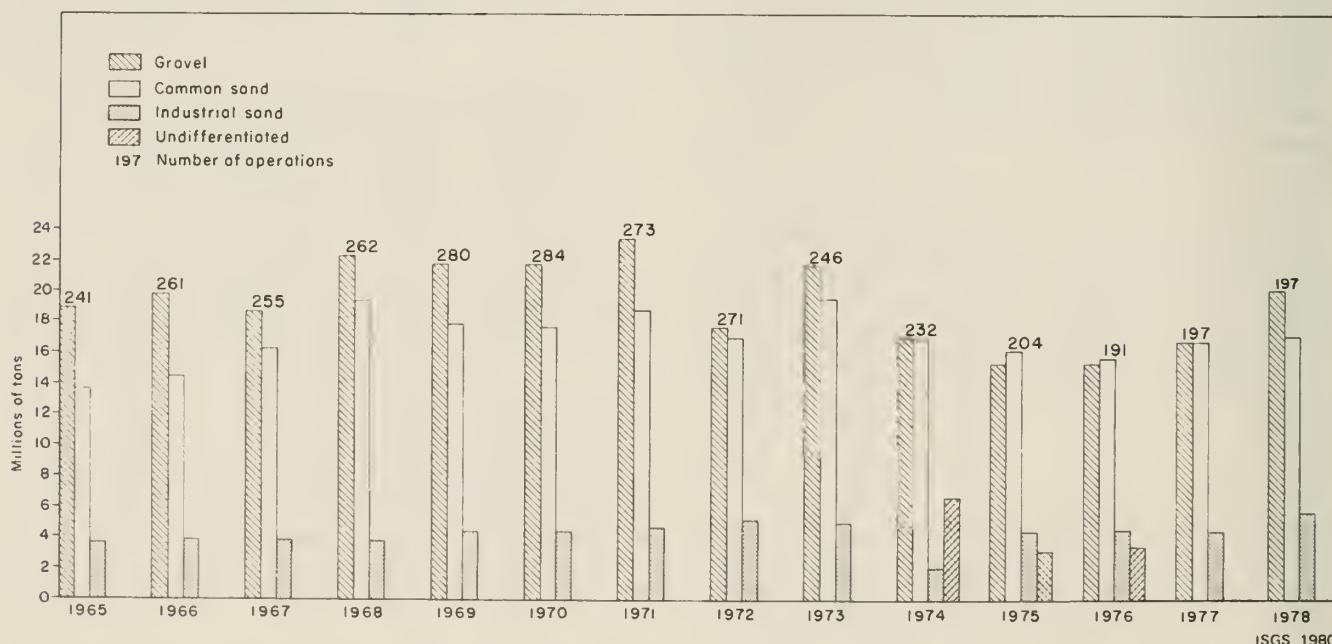


Figure 10. Trends in production of sand and gravel in Illinois, 1965-1978.

TABLE 21—ILLINOIS SAND AND GRAVEL PRODUCTION, BY SIZE OF OPERATION, 1977 AND 1978

Size of operation (tons per year)	1978			1977		
	Number of Operations	Production (1000 tons)	Percentage of commercial production	Number of operations	Production (1000 tons)	Percentage of commercial production
less than 25,000	39	399	0.9	50	484	1.3
25,000 to 49,999	21	743	1.7	26	957	2.4
50,000 to 99,999	35	2,315	5.3	30	1,994	5.3
100,000 to 199,999	42	6,021	13.9	41	5,988	15.9
200,000 to 299,999	25	6,224	14.3	16	3,851	10.2
300,000 to 399,999	9	3,111	7.2	13	4,424	11.8
400,000 to 499,999	7	3,119	7.2	5	2,231	5.9
500,000 to 599,999	0	—	—	2	W	W
600,000 to 699,999	3	W	W	4	2,538	6.7
700,000 to 799,999	1	W	W	1	W	W
800,000 to 899,999	4	W	W	2	W	W
900,000 to 999,999	0	—	—	1	W	W
1,000,000 and over	11	15,458	35.6	7	10,655	28.3
Total	197	43,447	100.0	198	37,633	100.0

W = withheld to avoid disclosing confidential data but included in total.

Source: U.S. Bureau of Mines.

TABLE 22—ILLINOIS SAND AND GRAVEL SOLD OR USED BY PRODUCER, BY CLASS OF OPERATION AND USE, 1977 and 1978

Class of operation and use	1978		1977		Change in quantity from 1977 to 1978 (%)	Change in value from 1977 to 1978 (%)		
	Quantity (1000 tons)	Value (\$1000)	Quantity (1000 tons)	Value (\$1000)				
<b>Construction aggregates</b>								
Sand and gravel								
Commercial operations <sup>a</sup>								
Building	17,025	42,307	12,947	30,292	+ 12.8	+ 18.6		
Paving	14,959	32,341	7,719	14,769	+ 16.6	+ 29.1		
Fill	5,341	8,078	4,230	5,646	+ 7.3	+ 18.5		
Other uses <sup>b</sup>	332	948	356	738	- 15.5	+ 16.7		
Total <sup>c</sup>	37,657	83,676	25,252	51,444	+ 13.1	+ 22.4		
Government and contractor <sup>a</sup>								
Building			2,143	5,380				
Paving			5,109	10,274				
Fill			746	1,182				
Other uses			37	74				
Total <sup>b</sup>			8,034	16,909				
Industrial sand								
Blast	e	e	e	e				
Molding	1,835	11,836	1,215	9,155	+ 51.0	+ 29.3		
Glass	2,605	13,992	1,916	8,821	+ 36.0	+ 58.6		
Other uses <sup>d</sup>	1,350	18,410	1,216	14,902	+ 11.0	+ 23.5		
Total <sup>c</sup>	5,790	44,238	4,347	32,877	+ 33.2	+ 34.6		
Total sand and gravel	43,447	127,914	37,633	101,230	+ 15.4	+ 26.4		

<sup>a</sup>Separate figures not available for commercial and government operations in 1978; 1977 figures added together for percentage change.<sup>b</sup>Includes railroad ballast.<sup>c</sup>Includes engine, filtration, foundry use, grinding and polishing, oil hydrofrac, pottery, abrasives, chemicals, enamel, and other uses.<sup>d</sup>Included with other uses to conceal for 1977 and 1978.

TABLE 23—PRODUCTION AND VALUE OF ILLINOIS STONE, BY COUNTY  
AND MODE OF TRANSPORTATION, 1978

County	Number of quarries	Crushed and broken		Production <sup>a</sup>		Mode of transportation			
		Limestone (tons)	Dolomite (tons)	Tons	Value (\$)	Truck (tons)	Rail (tons)	Barge (tons)	Unspecified (tons)
Adams	8	955,309	—	955,309	8,208,859	593,492	361,817	—	—
Boone	2	—	W	W	W	W	—	—	—
Brown	1	W	—	W	W	W	—	—	—
Calhoun	2	W	—	W	W	W	W	—	—
Carroll	8	328,774	—	328,774	758,931	328,774	—	—	—
Christian	1	W	—	W	1,500,000	W	—	—	—
Clark	2	W	—	W	W	W	—	—	—
Clay	1	W	—	W	W	W	—	—	—
Clinton	1	W	—	W	W	W	—	—	—
Coles	2	438,395	—	438,395	1,911,302	438,395	—	—	—
Cook	4	W	W	15,638,536	32,524,551	15,338,832	344,704	—	—
De Kalb	2	W	W	W	898,652	W	—	—	—
Douglas	1	W	—	W	W	W	—	—	—
Du Page	1	—	W	W	W	W	—	—	—
Fayette	1	W	—	W	W	W	—	—	—
Greene	4	314,102	—	314,102	892,528	314,102	—	—	—
Hancock	6	352,290	—	352,290	958,314	352,290	—	—	—
Hardin	5	2,767,268	—	2,767,268	5,590,601	1,496,866	—	1,270,402	—
Henderson	4	388,286	—	388,286	1,169,889	388,286	—	—	—
Henry	1	W	—	W	W	W	—	—	—
Iroquois	5	W	—	W	W	W	—	—	—
Jackson	2	W	—	W	W	W	—	—	—
Jersey	2	103,542	—	103,542	301,643	103,542	—	—	—
Jo Daviess	16	W	W	266,346	399,991	266,346	—	—	—
Johnson	2	W	—	W	W	W	W	—	—
Kane	3	1,396,830	—	1,396,830	3,591,513	1,396,830	—	—	—
Kankakee	5	W	W	W	W	W	W	—	—
Kendall	1	—	W	W	W	W	—	—	—
Lake	1	203,169	—	203,169	507,923	203,169	—	—	—
La Salle	10	2,284,720	—	2,284,720	5,642,240	1,709,711	—	—	575,009
Lawrence	1	48,900	—	48,900	97,800	48,900	—	—	—
Lee	9	W	W	1,475,459	3,056,790	1,475,459	—	—	—
Livingston	5	2,078,125	—	2,078,125	6,727,383	2,078,125	—	—	—
Logan	1	W	—	W	W	W	—	—	—
McDonough	2	W	—	W	W	W	—	—	—
Madison	3	1,230,718	—	1,230,718	3,603,132	1,230,718	—	—	—
Marion	1	W	—	W	W	W	—	—	—
Menard	3	843,230	—	843,230	2,191,145	843,230	—	—	—
Monroe	2	W	—	W	W	W	W	—	—
Montgomery	4	1,778,739	—	1,778,739	5,016,732	1,778,739	—	—	—
Ogle	16	W	W	878,034	2,307,411	878,034	—	—	—
Peoria	1	283,555	—	283,555	808,812	283,555	—	—	—
Pike	7	777,674	—	777,674	2,385,014	777,674	—	—	—
Pulaski	1	W	—	W	W	W	W	—	—
Randolph	2	W	—	W	W	W	—	—	—
Rock Island	4	1,393,852	—	1,393,852	4,710,073	1,393,852	—	—	—
St. Clair	4	2,712,511	—	2,712,511	6,943,031	2,712,511	—	—	—
Schuyler	1	W	—	W	W	W	—	—	—
Scott	3	W	—	W	W	W	—	—	—
Shelby	2	W	—	W	W	W	—	—	—
Stephenson	11	447,423	—	447,423	1,088,372	447,423	—	—	—
Union	2	W	—	W	W	W	—	—	—
Vermilion	4	W	—	W	W	W	—	—	—
Warren	3	898,744	—	898,744	2,476,081	898,744	—	—	—
Washington	1	W	—	W	W	W	—	—	—
Whiteside	4	W	—	W	W	W	—	—	—
Will	8	W	W	5,288,167	12,141,020	3,382,424	235,178	1,670,565	—
Winnebago	18	870,302	—	870,440	1,498,824	870,440	—	—	—
Undistributed <sup>b</sup>	45	600,002	—	600,002	1,310,086	600,002	—	—	—
Concealed totals		16,842,526	22,114,160	15,365,006	39,133,803	14,312,022	1,052,984	—	—
TOTALS	271	40,338,986	22,114,160	62,453,146	160,352,446	56,942,487	1,994,683	2,940,967	575,009

<sup>a</sup>Excludes dimension stone.

<sup>b</sup>County location not reported by producer.

W = withheld to avoid disclosing confidential data of individual companies, included in total.

Source: U.S. Bureau of Mines.

TABLE 24—ILLINOIS STONE PRODUCTION BY SIZE OF OPERATION, 1977 and 1978

Size of Operation (tons per year)	Number of quarries	1978 production <sup>a</sup> (tons)	Percentage of total	Number of quarries	1977 production (tons)	Percentage of total
less than 25,000	116	1,347,985	2.2	131	1,344,916	2.4
25,000 to 49,999	18	712,555	1.1	26	994,562	1.7
50,000 to 74,999	19	1,187,297	1.9	15	921,539	1.6
75,000 to 99,999	7	621,378	1.0	11	938,990	1.7
100,000 to 199,999	32	4,903,269	7.9	23	3,275,510	5.7
200,000 to 299,999	29	7,140,313	11.4	33	7,974,003	14.0
300,000 to 399,999	12	4,003,228	6.4	10	3,361,536	5.9
400,000 to 499,999	9	4,019,227	6.4	9	4,076,227	7.1
500,000 to 599,999	7	3,849,572	6.2	7	3,708,056	6.5
600,000 to 699,999	6	3,963,104	6.3	5	3,145,776	5.5
700,000 to 799,999	1	733,071	1.2	2	1,473,411	2.6
800,000 to 899,999	3	2,537,299	4.1	3	2,498,768	4.4
900,000 and over	12	27,434,848	43.9	9	23,360,532	40.9
Total	271	62,453,146	100.0	284	57,073,826	100.0

<sup>a</sup>Excludes dimension stone

Source: U.S. Bureau of Mines

gate, 4.2 million tons (8.3 percent) for surface treatment aggregate, 6.7 million tons (13.3 percent) for bituminous aggregate, 2.8 million tons (5.6 percent) for macadam aggregate, and 10.6 million tons (21.2 percent) for unspecified construction aggregate (table 25).

In 1978 Illinois used 5.1 million tons of stone—chiefly limestone—for agricultural purposes. This represents 8.1 percent of the total amount of stone produced. According to the National Lime Association, Illinois ranks among the top states in consumption of limestone for agricultural purposes. To supply this large market, Illinois has become a fairly large producer of agstone and ground limestone.

Illinois used 7.2 million tons of stone (11.6 percent of the 1978 total) for industrial, chemical, and other uses. High-calcium limestone, usually containing more than 95 percent CaO, was used in the manufacture of cement, in the manufacture of iron and steel (as flux-stone), in rock-dusting mines, and in various chemical industries.

In 1978, 38.5 percent of the dimension stone in Illinois was used as veneer in house construction. Rubble accounted for 46.1 percent of the dimension stone. The amount of flagging mined decreased for the second year from 42.8 percent in 1977 to 15.4 percent in 1978.

#### Tripoli (amorphous silica)

**Production.** The term "tripoli" refers to several fine-grained, porous, siliceous materials mined in four states. Tripoli is produced in Arkansas and Oklahoma; amorphous, or soft silica is mined in Illinois; and rottenstone is produced in

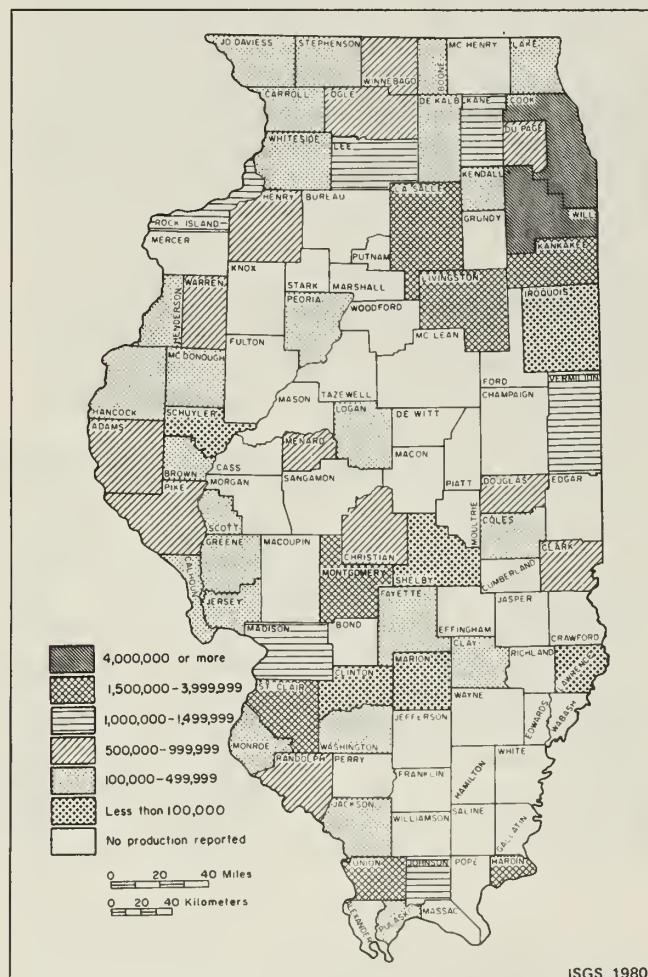


Figure 11. Illinois stone production by county, 1978. Source: U.S. Bureau of Mines.

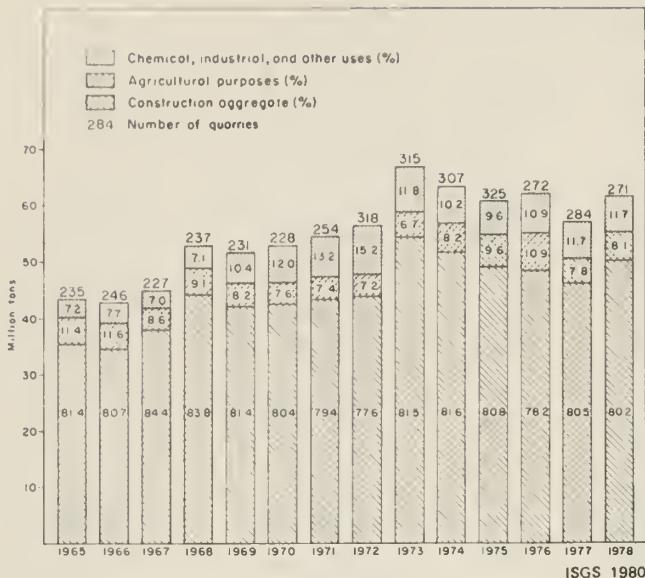


Figure 12. Trends in uses of crushed and broken stone produced in Illinois, 1965-1978.

Pennsylvania. Illinois has been the nation's largest producer of these siliceous materials in recent years, accounting for more than half of total U.S. production in 1978.

In 1978, amorphous silica was produced from two mines in Alexander County by two companies—Illinois Minerals Company and Tammsco Inc. The value of crude tripoli decreased by 19.7 percent, while quantity decreased by 18 percent from 1977. Most Illinois tripoli was processed in the state.

**Consumption and uses.** The amorphous silica processed in Illinois was used for abrasives and filler. The quantity of prepared materials sold in 1978 was 2.8 percent more than that sold in 1977; the value was up 21.9 percent from 1977.

## METALS

### Zinc, lead, silver, and germanium

**Production.** During 1978 the metals recovered from ore mined in Illinois—zinc, lead, silver, and germanium—were recovered from fluorspar ore mined in Hardin and Pope Counties by the Allied Chemical Corporation and the Ozark-Mahoning Company. Zinc production was down 31.8 percent, value was down 38.5 percent; lead production was up 59.3 percent, value was up 74.8 percent; silver production stayed the same, value was up 22.2 percent; germanium has been produced intermittently over the last few years in small amounts. Production data are not available for germanium, and actual production figures for zinc, lead, and silver are withheld to avoid disclosing individual company data.

## OTHER MINERALS

### Peat

Although peat is classified as a fuel by the U.S. Bureau of Mines, virtually all commercial sales of peat in the United States (excluding imports) are for agricultural and horticultural purposes, specifically, for soil improvement. Three major kinds of peat—reed-sedge, moss, and peat humus—were produced in Illinois.

In 1978 Illinois continued to rank third, after Michigan and Florida, among the 22 peat-producing states and accounted for 10.5 percent of the nation's total peat production and 12.4 percent of its value. Three companies at four plants produced 84,310 tons of peat valued at \$1,594,000 (table 26). Peat production, which increased 4.9 percent during 1978, was reported in Cook, Lake, and Whiteside Counties.

TABLE 25—USE OF CRUSHED AND BROKEN STONE PRODUCED IN ILLINOIS, 1978

Use	Limestone (tons)	Dolomite (tons)	Total (tons)	Percentage of total	Percentage of change from 1977	Average value per ton
Road base stone	12,546,233	4,374,144	16,920,377	27.1	+ 15.5	2.56
Concrete aggregate	5,545,067	3,417,157	8,962,224	14.3	- 4.5	2.54
Surface treatment aggregate	1,759,590	2,408,715	4,168,305	6.7	+ 3.4	2.36
Bituminous aggregate	3,216,218	3,434,927	6,651,145	10.6	+ 19.4	2.38
Unspecified construction	6,653,962	3,975,872	10,629,834	17.0	+ 12.7	2.46
Agricultural purposes <sup>a</sup>	4,416,736	650,424	5,067,160	8.1	+ 13.2	2.98
Cement	3,189,269	--	3,189,269	5.1	+ 4.0	1.94
Macadam aggregate	1,220,504	1,568,205	2,788,709	4.5	- 1.7	2.27
Flux stone	wb,c	wb,c	wb,c		- 13.3	2.08
Riprap & jetty	461,710	138,590	600,300	1.0	+ 10.7	2.64
Railroad ballast	217,492	582,522	800,014	1.3	+ 25.1	2.09
Other uses <sup>d</sup>	1,112,205	1,563,604	2,675,809	4.3	+ 9.3	6.48
Total	40,338,986	22,114,160	62,453,146	100.0	+ 9.4	2.57

<sup>a</sup>Includes agricultural limestone and poultry grit.

<sup>b</sup>W = withheld to avoid disclosing confidential data of individual companies; included in total.

<sup>c</sup>Included with other uses.

<sup>d</sup>Includes stone for asphalt filler, chemicals, lime manufacture, mine dusting, filler, roofing aggregate, fill, waste material, whiting, and other uses.

Source: U.S. Bureau of Mines.

TABLE 26—PRODUCTION AND COMMERCIAL SALES OF PEAT  
IN ILLINOIS, 1971-1978

Year	Number of plants	Production (tons)	Commercial sales (tons)	Value (\$)	Average value per ton (\$)	Illinois production (%)
1971	7	72,523	71,823	W	W	12.03
1972	5	69,523	74,003	W	W	12.06
1973	6	71,552	71,551	1,037,000	14.49	11.28
1974	6	95,807	95,807	1,412,000	14.74	13.11
1975	6	96,295	95,719	1,511,401	15.79	12.48
1976	4	84,662	87,087	763,000	8.76	8.73
1977	6	80,355	82,356	1,477,595	17.94	10.24
1978	4	86,000	84,300	1,590,000	18.86	10.46

<sup>a</sup>Illinois production as percentage of U.S. production.

W = withheld to avoid disclosing data from individual companies.

Source: U.S. Bureau of Mines.

## Gemstones

Fluorspar, the gemstone produced in Illinois, contributed little to the total value of mineral production. The 1978 estimated value of gemstones increased considerably from \$2,000 in 1977 to \$15,000.

## Primary barite

Beginning in 1974, primary barite was produced in Illinois in minor amounts as a by-product of the fluorspar industry. The production of primary barite and its value decreased considerably in 1978. Only one plant reported production for 1978—Allied Chemical Corporations. Minerva Mines produced barite flotation concentrates as a by-product in Hardin County. Barite is used primarily as a weighting agent in drilling muds, and is also used in the manufacture of paint, glass, and rubber and in the production of barium chemicals.

## Mineral materials processed

Mineral materials produced mainly in other states and foreign countries but processed in Illinois in 1978 included ground barite, bismuth, columbium and tantalum, calcined gypsum, crude iodine, iron oxide pigments, natural gas liquids, expanded perlite, pig iron, sulfur, exfoliated vermiculite, primary slab zinc, and secondary slab zinc.

## Ground barite

Ground barite was produced in East St. Louis, St. Clair County, by Mineral Pigments and Metals Division of Pfizer, Inc. The 1978 production and value increased slightly, by 11.4 and 56.6 percents, respectively. The ground barite produced in Illinois is used almost exclusively as a filler or an extender in paint.

## Bismuth

A small quantity of bismuth was recovered by recycling secondary material at the United Refining and Smelting

Company, Franklin Park, Cook County. Bismuth is used in fusible alloys, in pharmaceutical chemical applications, and as a metallurgical additive. Production figures are not available for Illinois; however, according to the the U.S. Bureau of Mines, U.S. production declined in 1978 while U.S. consumption increased.

## Columbium and tantalum

Processing of columbium-tantalum concentrate imported from foreign countries was reported by Fansteel, Inc. of Chicago. Fansteel produced columbium, tantalum metal, and tantalum carbide. Columbium and tantalum are used primarily in the production of various steel alloys. Production figures are not available.

## Calcined gypsum

Gypsum imported from out-of-state mines was calcined at Waukegan, Lake County, by the National Gypsum Company. In 1978, the quantity of gypsum calcined was 6.0 percent higher, and the value 22.9 percent higher than in 1977.

## Crude iodine

Crude iodine was processed for commercial use at two plants in 1978: Abbott Laboratories in North Chicago, Lake County, and Economics Laboratory, Inc. in Joliet, Will County. Both organic and inorganic compounds were produced. Consumption of crude iodine increased 8 percent in quantity and 42.1 percent in value over 1977. Iodine is used primarily as a catalyst or stabilizer, or in animal feed, inks, colorants, pharmaceuticals, and sanitary and industrial disinfectants.

## Iron oxide pigments

Illinois plants processed 32,884 tons of iron oxide pigments valued at \$19.1 million in 1978, a decrease of 16.2 percent in quantity, but an increase of 5.16 percent in value from 1977. The finished pigments were produced from iron ore imported from other states by the Prince Manufacturing Company of Quincy in Adams County; the George B. Smith Chemical Works of Maple Park in Kane County; Pfizer, Inc., of East St. Louis in St. Clair County; and Solomon Grinding Service of Springfield in Sangamon County. Pigments produced by these companies included 8,841 tons of natural red iron oxides (a 46.5 percent decrease) valued at \$0.9 million as well as natural brown iron oxides and synthetic iron oxides.

## Natural gas liquids

Natural gas liquids include ethane, propane, isobutane, unsplit butane, and a combination of gasoline and liquefied petroleum gas (LPG). Natural gas was processed in 1978 in Douglas County at the Tuscola plant of the United

States Industrial Chemical Company, a division of National Distillers and Chemical Corporation.

### Expanded perlite

Crude perlite mined outside the state was processed by Silbrico Corporation in Cook County; Mica Pellets, Inc., in De Kalb County; Filter Products Corporation and National Gypsum Company, both in Lake County; and Johns-Manville Sales Corporation in Will County. Expanded perlite is used primarily as an aggregate for concrete and plaster, for horticultural aggregate, for roof insulating board, for low-temperature insulation, and for aid in filtering. Perlite production in 1978 increased by 2.1 percent over 1977, and value increased 4 percent.

### Pig iron and raw steel

During 1978, 6.9 million tons of pig iron valued at \$1,157.1 million were produced in blast furnaces in Illinois, representing increases in production and value of 11.3 percent and 0.1 percent, respectively, from the 1977 levels. Illinois is one of the nation's leading steel-producing states, ranking fourth in 1978. Four of the five Illinois steel plants are located in Cook County—Interlake Steel Company, Wisconsin Steel Division of Envirodyne Industries, Inc., United States Steel Corporation, and Republic Steel Corporation. The fifth plant, Granite City Steel Division of National Steel Corporation, is in Madison County.

Republic Steel Corporation unveiled two new Q-BOP (bottom-blown basic-oxygen process) 225-ton furnaces at its Chicago plant in April 1978. The new furnaces consume 70 percent less energy than the open-hearth furnaces they replaced. The basic-oxygen process results in a sharp reduction of emissions compared with the older units.

According to the American Iron and Steel Institute in Washington, D.C., 12.4 million tons of raw steel (about 9 percent of the United States output) were produced in Illinois in 1978, an increase of 14.3 percent from the 1977 level of 10.9 million tons.

### Recovered elemental sulfur

During 1978, elemental sulfur was recovered by six companies operating eight plants: Union Oil Company of California at its Chicago plant in Cook County; Marathon Oil Company at its Robinson refinery in Crawford County; Natural Gas Pipeline Company of America at its St. Elmo plant in Fayette County and its Herscher plant in Kankakee County; Texaco, Inc., at its Lawrenceville plant in Lawrence County and at its Lockport plant in Will County; Shell Oil Company at its Hartford plant in Madison County; and Mobil Oil Corporation at its Joliet refinery in Will County.

The amount of sulfur recovered in 1978 was 201,948 tons; this was valued at \$7,867,387. Illinois ranked sixth

in the nation in quantity of elemental sulfur recovered and seventh in value of shipments.

### Exfoliated vermiculite

Crude vermiculite mined outside the state was processed by the Construction Products Division of W. R. Grace and Company in West Chicago, Du Page County; by Mica Pellets, Inc. in De Kalb, De Kalb County; and by the International Vermiculite Company in Girard, Macoupin County. About 23.3 percent of the total amount of exfoliated vermiculite processed was used for loose-fill insulation, 26 percent for block insulation, 11.1 percent for concrete aggregate, and 10.2 percent for horticultural purposes. Fertilizer carrier, plaster aggregates, soil conditioning, and other unspecified uses accounted for the remaining 29.4 percent of the total. The quantity of exfoliated vermiculite processed in 1978 was 19.9 percent lower than in 1977, and the value decreased by 5.5 percent.

### Primary slab zinc

Five states, including Illinois, accounted for all of the smelter production of primary slab zinc in 1978. AMAX, Inc. in Sauget, St. Clair County, processed special high-grade zinc from domestic and foreign ores and concentrates. Production data for 1978 are not available.

### Secondary slab zinc

During 1978, secondary slab zinc was produced by Apex Smelting Company in Chicago (Cook County) and by Sandoval Zinc Company in Sandoval (Marion County). Production data are not available.

### Mineral products manufactured

Mineral products manufactured in Illinois in 1978 from crude mineral materials mined in Illinois and elsewhere included cement, clay products, coke, glass, and lime. Available data are given in the next sections.

### Cement

*Production.* In 1978, 2,122,587 tons of finished portland cement were manufactured in Illinois, a 10.8 percent increase over 1977 production. Production of prepared masonry decreased 11.8 percent in 1978; however, since there were only two producers in 1978, production data is withheld. Four Illinois companies produced cement: Centex Corporation at La Salle, La Salle County; Gulf & Western Cement Manufacturing Company at Oglesby, La Salle County; Medusa Corporation at Dixon, Lee County; and Missouri Portland Cement Company at Joppa, Massac County.

Finished portland cement shipments totaling 2,112,477 tons were valued at \$80.2 million, a 15.8 percent increase in quantity and a 29.7 percent increase in value from the 1977 level (table 27). The quantity of prepared masonry cement shipments decreased by 6.2 percent, while value increased 2 percent.

Raw materials used in the manufacture of cement include cement rock (an argillaceous limestone containing lime, silica, alumina, and magnesia), limestone, clay, shale, sand, fly ash, slag, and gypsum. In 1978 Illinois produced 3,189,269 tons of crushed limestone for use in manufacturing cement (table 25) and consumed 2,989,923 tons (including cement rock), which means that Illinois was a net exporter of limestone for use in cement.

Bulk shipments of cement from Illinois plants to customers were made by truck (98.4 percent), rail, and barge. Container shipments of cement were made by truck and rail only, with 88.9 percent of the shipments moved by truck.

**Consumption.** A total of 3,666,000 tons of portland cement was consumed in Illinois in 1978—44,000 tons more than in 1977 (fig. 13). Only 57.9 percent of the portland cement consumed in Illinois was produced in the state; the rest was imported from other states.

Illinois consumed 142,000 tons of masonry cement in 1978—9,000 tons more than in 1977.

### Clay products

To obtain accurate, current information about the amount and value of clay products manufactured in Illinois, the Illinois State Geological Survey sends questionnaires every year to all producers in the state. Several companies closed down in 1978 or were shut down just for the year, lowering the total clay products production considerably. Seven of the companies responding to the 1978 questionnaire reported clay mining operations.

The total value of clay products produced in Illinois in 1978 was \$46.4 million: whiteware and pottery, \$18.6 million; structural clay products such as common and face

TABLE 27—PRODUCTION AND VALUE OF PORTLAND CEMENT MANUFACTURED IN ILLINOIS, 1977 and 1978

	1978	1977	Percentage of change from 1977 to 1978
Number of active plants	4	4	--
Production (tons)	2,122,587	1,915,206	+ 10.83
Shipment from mills			
Quantity (tons)	2,112,477	1,823,474	+ 15.85
Value	80,242,233.00	61,849,444.00	+ 29.74
Average value per ton	37.99	33.93	+ 11.97
Stocks at mills, Dec. 31 (tons)	126,000.00	187,000.00	- 32.62

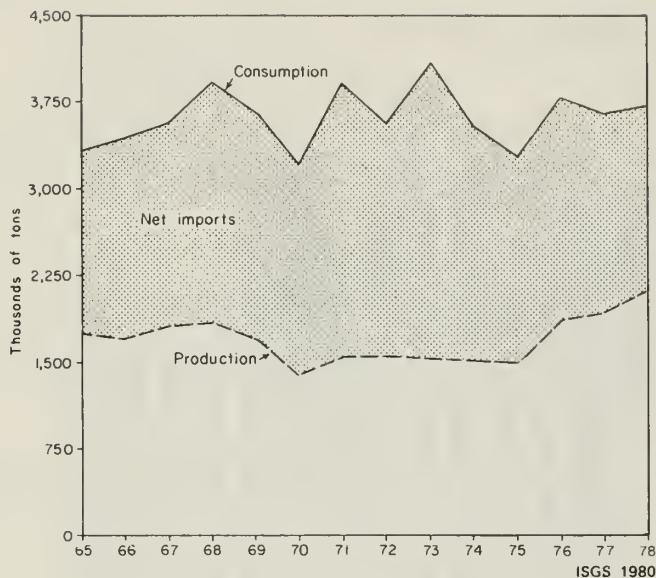


Figure 13. Production and consumption of finished portland cement in Illinois, 1965-1978.

brick, drain tile, and sewer pipes, \$17.1 million; and refractories and other products, \$10.7 million. According to the U.S. Department of Commerce, in 1978 Illinois produced 132.9 million bricks (building-common and face); 124.9 million bricks were shipped at a value of \$11.9 million.

### Coke

**Production.** In 1978 Illinois produced 1,431,000 tons of coke and recovered 189,000 tons of coke breeze from four oven coke operations—three in Cook County and one in Madison County. Coke production was down 10.1 percent, and breeze production was down 75.2 percent from 1977 (table 28). On the basis of an average value of \$107.06/ton (up \$3.97/ton from 1977) received by producers for all grades of coke, Illinois coke production in 1978 was valued at \$153.2 million, 6.8 percent lower than the 1977 value (table 29). Most of the coke produced in 1978 was used in blast furnaces by the producing companies, and some coke was sold from stocks. By-products in addition to coke breeze recovered at Illinois oven-coke plants included coke-oven gas tar, crude light oil, and ammonia.

The coal used for the manufacture of coke in Illinois in 1978 came from Illinois (28.8 percent) and eight other states: Kentucky, 34.9 percent; West Virginia, 19.0 percent; Virginia, 7.5 percent; Pennsylvania, 6.2 percent; Oklahoma, 1.7 percent; Tennessee, 1.0 percent; Arkansas, 0.5 percent; Georgia, 0.2 percent (table 29).

Illinois coal used for coking purposes was shipped from mines in Jefferson, Franklin, and Saline Counties only, according to the U.S. Bureau of Mines.

**Consumption and uses.** Illinois consumed 4,345,000 tons of coke and 266,000 tons of coke breeze in 1978 (table 28),

TABLE 28 — PRODUCTION AND CONSUMPTION OF COKE IN ILLINOIS, BY USE, 1974-1978 (1000 tons)

Year	Coke uses (1000 tons)						Breeze production	Total breeze consumption
	Coke production	Blast furnace	Foundry	Other industrial plants	Residential heating	Total coke consumption <sup>a</sup>		
1974	1,912	2,867	213	32	b	3,112	212	365
1975	1,924	2,954	148	19	b	3,122	251	334
1976	1,706	3,356	174	7	b	3,537	270	319
1977	1,591	3,496	177	30	b	3,703	762	216
1978	1,431	4,152	151	42	b	4,345	189	266

<sup>a</sup>Data may not add up to totals shown because of independent rounding.<sup>b</sup>Included with "Other industrial plants."

Source: U.S. Bureau of Mines.

TABLE 29—QUANTITY AND VALUE OF COKE AND BY-PRODUCTS PRODUCED, SOLD, OR USED BY PRODUCER IN ILLINOIS, 1977 and 1978

Coke and by-products	Unit	Quantity	1978		1977		Value at plant Total (\$1000)	Value at plant Average (\$ per ton)
			Total (\$1000)	Average (\$ per ton)	Quantity	Total (\$1000)		
<b>Plants in operation</b>								
Coal, carbonized	thousand tons	2,255	112,113	49.71	2,470	104,456	42.29	
Coal per ton of coke	tons	1.58	--	78.54	1.55	--	65.55	
Coke produced	thousand tons	1,431	153,203	107.06	1,591	164,303	103.27	
Coke yield, percent of coal carbonized	percent	63.45			64.41			
<b>Source of coal carbonized</b>								
Illinois	thousand tons	472	--	--	868	--	--	
Kentucky	thousand tons	572	--	--	928	--	--	
West Virginia	thousand tons	312	--	--	588	--	--	
Pennsylvania	thousand tons	102	--	--	89	--	--	
Virginia	thousand tons	123	--	--	220	--	--	
Oklahoma	thousand tons	28	--	--	6	--	--	
Arkansas	thousand tons	9	--	--	--	--	--	
Tennessee	thousand tons	16	--	--	--	--	--	
Georgia	thousand tons	4	--	--	--	--	--	
Total	thousand tons	1,638	--	--	2,699	--	--	
From stock or to stock	thousand tons	+ 617	--	--	- 229	--	--	
<b>Coke sold or used by producer</b>								
Blast furnace	thousand tons	W	W	W	1,551	140,300	--	
Other purposes	thousand tons	W	W	W	W	W	--	
Total used	thousand tons	2,402	229,738	--	W	W	--	
<b>Commercial sales</b>								
Blast furnaces	thousand tons	W	W	W	W	W	W	
Other industrial plants	thousand tons	--	--	--	--	--	--	
Residential	thousand tons	--	--	--	--	--	--	
<b>Coke oven by-products</b>								
Ammonia produced (sulfate equivalent)	thousand tons	12	--	--	16	--	--	
Per ton of coal cokes	lb	10.84	--	--	12.72	--	--	
Sulfate equivalent sold	thousand tons	11	538	--	15	650	--	
Coke oven gas produced	million cu ft	22,957	--	--	24,733	--	--	
Per ton of coal	thousand cu ft	10.18	--	--	10.01	--	--	
Used in heating coke ovens	million cu ft	10,117	--	--	9,930	--	--	
Surplus used or sold	million cu ft	11,261	12,469	1.107/Mcf	13,255	13,066	0.986/Mcf	
Wasted	million cu ft	1,578	--	--	1,548	--	--	
Light oil and derivatives sold	thousand gal	5,843	--	--	5,474	--	--	
Tar produced	thousand gal	15,497	--	--	15,276	--	--	
Per ton of coal coked	gal	6.06	--	--	6.18	--	--	
Used by producers	thousand gal	W	--	--	W	--	--	
Sold for refining	thousand gal	15,940	5,593	0.351/gal	11,574	3,752	0.324/gal	
<b>Total coke and by-products sold or used (excluding light oil and derivatives sold)</b>								
			171,803			181,771		

W = withheld to avoid disclosure of data from individual companies.

Source: U.S. Bureau of Mines.

a 17.3 percent increase in coke consumption and a 23.1 percent increase in breeze consumption from the 1977 level. Coke is used for the production of pig iron, for foundry and other industrial purposes, and for residential heating. Coke breeze was used for fuel in steam plants, in agglomerating plants, and elsewhere.

#### Glass

Glass and/or fiberglass was manufactured by companies in Du Page, Lake, La Salle, Logan, McLean, Macon, Madison, Marion, Montgomery, St. Clair, and Will Counties. Production data are not available.

#### Lime

**Production.** In 1978 Illinois ranked eighth in the nation in lime production. Production increased 6.8 percent in 1978 and value increased 16.9 percent from 1977. Quicklime was produced by two companies in Cook County: Marblehead Lime Company, a division of General Dynamics, operates two plants (at South Chicago and Thornton) and Vulcan Materials Company operates one plant (at McCook). Hydrated lime was produced at both Marblehead plants.

**Consumption and uses.** A total of 1,159,000 tons of lime was consumed in Illinois in 1978, 12.4 percent more than in 1977 (fig. 14). Illinois was one of the leading lime-consuming states. The lime was used for steel furnaces, refractories, water purification, sewage treatment, and other purposes.

### ■ PRELIMINARY PRODUCTION DATA: 1979

According to the U.S. Bureau of Mines, preliminary figures for 1979 show that Illinois remained the leading producer of fluorspar and tripoli. Illinois ranked third in peat production, fourth in both stone and fuller's earth, fifth in coal and slag (iron and steel), and sixth in sand and gravel. Coal continued to be the leading mineral commodity in 1979, valued at \$1,371.6 million, or 63.5 percent of the total value of mineral materials mined (\$2,160.3 million).

#### Mineral materials mined

Preliminary production data for Illinois indicate that the total value of mineral materials mined reached a record high of \$2,160.3 million—a 32 percent increase over the value reported for 1978 (table 30). The increase in value resulted from greater production of several minerals but also from a general rise in mineral-commodity prices.

#### Fuels

Coal, crude oil, and natural gas, the mineral fuels produced during 1979, were valued at \$1,810.4 million. Of this

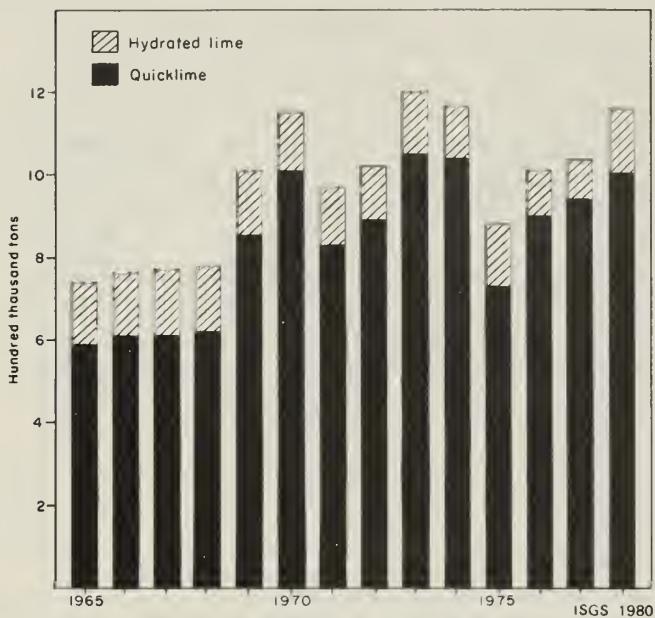


Figure 14. Trends in consumption of quicklime and hydrated lime in Illinois, 1965-1978. Source: U.S. Bureau of Mines.

amount, 75.7 percent came from coal, 24.1 percent from crude oil, and the remaining 0.2 percent from natural gas. In 1978, the value of mineral fuels produced totaled \$1,321.2 million—37 percent lower than the 1979 level.

**Coal.** Illinois production increased in 1979 to 59.6 million tons from 48.7 million tons in 1978, the year most affected by the nationwide coal strike. This was a 22.3 percent increase. Illinois ranked fifth in the nation again in 1979.

The increased value of Illinois coal production in 1979 (37.5 percent over the 1978 level) resulted from increased production and from an increase in average f.o.b. mine price of Illinois coal from \$20.46 in 1978 to an estimated \$23.00 in 1979. Of the total 59.6 million tons of coal produced in Illinois, 32.7 million tons (54.9 percent) came from underground mines and 26.9 million tons (45.1 percent) came from surface mines. These figures represent a 31.3 percent increase in underground mining and a 12.6 percent increase in surface mining from 1978. This is the seventh consecutive year in which mine production exceeded that of surface mining.

In 1979, 22 counties reported coal production, one more than in 1978. According to the Illinois Department of Mines and Minerals, 71 coal mines (31 underground and 40 surface mines) operated in Illinois during 1979. Total employment in Illinois mines increased in 1979 to 18,499 (13,200 underground and 5,299 surface mines) from 17,861 in 1978.

The various consuming sectors and the states to which Illinois coal was shipped in 1978 and 1979 are shown in tables 31 and 32.

Illinois is still facing the same market conditions that have kept producers well under capacity. The Clean Air

TABLE 30—PRELIMINARY MINERAL PRODUCTION DATA FOR 1979

Commodity	Unit	1979		1978		Percentage of change from 1978 to 1979	
		Quantity	Value (\$1000)	Quantity	Value (\$1000)	Quantity	Value
<b>MINERAL MATERIALS MINED</b>							
Fuels							
Coal	thousand tons	59,635	1,371,595	48,744	997,305	+ 22.3	+ 37.5
Crude oil	thousand bbl	21,793	435,860	23,362	322,394	- 6.7	+ 35.2
Natural gas	thousand Mcf	1,585	2,948	1,159	1,495	+ 36.8	+ 97.2
Industrial and construction materials							
Stone <sup>a</sup>	thousand tons	63,551	188,130	65,053	160,475	- 2.3	+ 17.2
Sand and gravel	thousand tons	45,448	134,190	43,447	127,914	+ 4.6	+ 4.9
Clay <sup>b</sup>	thousand tons	542	2,355	742	3,185	- 27.0	- 26.1
Fluorspar	tons	103,845	11,739	115,859	12,452	- 10.4	- 5.7
Tripoli	tons	W	W	W	W	+ 30.8	+ 32.2
Metals							
Lead	tons	W	W	W	W	- 20.7	+ 36.7
Zinc	tons	W	W	W	W	- 14.3	+ 13.6
Silver	thousand troy ounces	W	W	W	W	- 1.5	+109.1
Others							
Peat	thousand tons	86	1,610	84	1,594	+ 2.4	+ 1.0
Gemstones	--	NA	15	NA	15	-	-
Barite	tons	W	W	W	W	-	- 64.0
Values that cannot be disclosed (W)			11,860		10,201		+ 16.3
Total value of mineral materials mined			2,160,302		1,637,030		+ 32.0

<sup>a</sup>Includes dimension stone.<sup>b</sup>Excludes fuller's earth; included with value of items indicated by symbol W.

W = withheld to avoid disclosing individual company confidential data.

NA = not available.

Source: U.S. Bureau of Mines, Illinois Department of Mines and Minerals, and Oil and Gas Section of the Illinois State Geological Survey.

TABLE 32 — COAL SHIPMENTS FROM ILLINOIS TO CONSUMING STATES, 1978 AND 1979 (1000 unit tons)

Consuming state	1978	1979	Percentage of change
<b>TABLE 31 — COAL SHIPMENTS FROM ILLINOIS TO CONSUMING SECTORS IN THE UNITED STATES, 1978 AND 1979 (1000 unit tons)</b>			
Consuming Sector	1978	1979	Percentage of change
Electric utilities	41,142	49,850	+ 21.2
Coke and gas plants	2,141	2,990	+ 39.7
Retail dealers	171	176	+ 2.9
All others	6,037	4,989	+ 25.9
Railroads	--	--	--
Used at mine	46	49	+ 6.5
Mine stock (adjusted)	+ 1	+ 1	--
<b>TOTAL</b>	<b>48,490</b>	<b>59,349</b>	<b>+ 22.4</b>
Source: U.S. Bureau of Mines Bituminous Coal and Lignite Distribution, calendar years 1978 and 1979.			
<b>TABLE 32 — COAL SHIPMENTS FROM ILLINOIS TO CONSUMING STATES, 1978 AND 1979 (1000 unit tons)</b>			
Consuming state	1978	1979	Percentage of change
Illinois	20,509	21,739	+ 6.0
Missouri	11,000	13,215	+ 20.1
Indiana	5,440	9,891	+ 81.8
Wisconsin	3,994	3,831	- 4.1
Iowa	2,213	2,855	+ 29.0
Kentucky	335	464	+ 38.5
Minnesota	753	752	- 0.1
Mississippi	399	210	- 47.4
Michigan	901	944	+ 4.8
Georgia	822	1,659	+ 101.8
Florida	1,052	1,492	+ 41.8
Tennessee	43	416	+ 867.4
Alabama	846	1,757	+ 107.7
Other states <sup>a</sup>	159	100	- 37.1
Exports (Canada)	24	24	--
<b>TOTAL</b>	<b>48,490</b>	<b>59,349</b>	<b>+ 22.4</b>

<sup>a</sup>Includes coal used at mines and net change in mine inventory.

Source: U.S. Bureau of Mines Bituminous Coal and Lignite Distribution, calendar years 1978 and 1979.

Act has forced utilities to switch from high-sulfur to low-sulfur products; therefore, little improvement is expected until the mid-1980s, when new generating plants equipped to burn high-sulfur coal begin to operate. To meet the projected increase in demand for coal, several new mines are being built in Illinois. Tables 33 and 34 list the new mines and expansions to existing mines officially announced as of August 1980.

**Crude oil and natural gas.** Production decreased again in 1979. The production of crude oil in Illinois decreased 6.7 percent, from 23.4 million barrels in 1978 to 21.8

million barrels in 1979. At an average value of \$20.00 per barrel, 1979 production was valued at \$435.9 million. Both the marketed production of natural gas and its value increased in 1979. The amount of total natural gas marketed was 1,585 million cubic feet—a 36.8 percent increase over the 1978 level. The gas was valued at \$2.9 million—a 97.2 percent increase over the 1978 value of \$1.5 million (table 30).

According to data from the Oil and Gas Section of the Illinois State Geological Survey, the total footage drilled by the oil- and gas-producing industry in Illinois in 1979, including service wells and structure tests, was 3,037,673

TABLE 33—NEW COAL MINES ANNOUNCED OR UNDER CONSTRUCTION IN ILLINOIS  
(as of August 1980)

Company and mine name	Location	County	Type of mine <sup>a</sup>	Coal Seam	Principal market	Scheduled initial production	Capacity at full operation (million tons)	Status
AMAX Coal Co.								
Crab Orchard	Near Crab Orchard	Williamson	S	Herrin (No. 6)	Steam	1981	1.00	Announced
Unnamed	NA	NA	U	NA	Steam	1986	1.65	Announced
Atlantic Richfield Co.								
Black Hawk	NA	Edwards	U	Harrisburg (No. 5)	Steam	1983	2.50	Announced
Chatham Coal Co.								
Nicor	Near Virden	Sangamon	U	Herrin (No. 6)	Steam	1981	2.00	Announced
Energy Supply Inc.								
Rushville	Near Rushville	Schuylerville	S		Steam	1980	0.60	Announced
Freeman United Coal Mng. Co.								
Crown 3	Girard	Macoupin	U	Herrin (No. 6)	Steam	1982	2.00	Under construction
Industry	Industry	McDonough	S	Colchester (No. 2)	Steam	1982	0.50	Announced
Kerr-McGee Coal Corp.								
No. 5	NA	Saline	U	NA	Steam	1983	2.00	Announced
No. 6	NA	Saline	U	Herrin (No. 6)	Steam	1985	2.50	Announced
Mapco								
Whitetiki	SE of Carmi	White	U	Herrin (No. 6)	Steam	1984	NA	Announced
Morris Coal, Inc.								
Morris 6	NA	Williamson	U	NA	Steam	1980	1.00	Announced
Peabody Coal Co.								
Tilden	NA	Washington	U	Herrin (No. 6)	Steam	1981	1.25	Announced
Baldwin 3	St. Libory	St. Clair	U	Herrin (No. 6)	Steam	1982	1.25	Under construction
Shell Oil Co.								
Niantic Annex 1	Elkhart	Logan	U	Springfield (No. 5)	Steam	1983	1.90	Announced
Zeigler Coal Co.								
No. 6	NA	Williamson	U	Herrin (No. 6)	Steam	1982	2.00	Announced

<sup>a</sup>S = surface; U = underground.

NA = not available.

feet (down 1.5 percent from 1978). There were 1,087 new holes drilled for oil and gas in 44 of the 102 Illinois counties, the same number of counties as in 1977. Six counties (White, 149; Crawford, 129; Wayne, 126; Clay, 91; Jefferson, 76; Jasper, 63) accounted for 58 percent of the new holes. The new holes resulted in 627 oil wells, 15 gas wells, and 445 dry holes—a success ratio of 59.1 percent.

The activity in the oil industry for 1979 was great because of the rising price of oil. One feature of drilling activity during the past several years has been the testing of the Salem and Ullin Limestones. This testing continued in 1979 and accounted for part of the high level of drilling activity reported. The Salem and Ullin Limestones accounted for 19 percent of the 1979 discoveries and extensions.

### Industrial and construction materials

Preliminary data for 1979 show that production of stone, clay, and fluorspar decreased in 1979, whereas production of tripoli and sand and gravel increased. Total stone production in Illinois decreased approximately 5 percent, which ranked Illinois fourth in total production in the United States. Sand and gravel production increased approximately 5 percent. Illinois was the leading state in pro-

duction of industrial sand and gravel in 1979, and ranked sixth in total sand and gravel production.

Illinois remained the leading producer of fluorspar, producing 90 percent of U.S. production. Production fell 11 percent, however, and value fell 7 percent for the year. This reflected a continuing and steady downward trend by the domestic fluorspar industry.

The Minerva fluorspar mining complex at Cave-in-Rock, Illinois, has been sold by Allied Chemical Corp. to Inverness Mining Co., a subsidiary of privately owned Seaforth Mineral and Ore Co. of Cleveland. The mine, which was closed at the end of September 1979, will reopen sometime in 1980 and will be in full production within 3 months. Allied Chemical Corp. will purchase its fluorspar supplies from outside sources.

Clay was produced in 1979 by 15 companies at 19 mines and pits. Production of clay fell 27 percent from the 1978 level. Illinois ranked fourth among 9 states producing fuller's earth.

Tripoli production, reported by two companies in Alexander County, increased by 36.9 percent.

Silicon carbide, an artificial abrasive, was produced for the first time in 1979 by ESK Corp. in Putnam County. Located near Hennepin, the plant opened with a yearly

TABLE 34—ILLINOIS COAL MINE EXPANSIONS  
AND NEW MINES NOT AT FULL CAPACITY  
(as of August 1980)

Company and mine name	Location	County	Type of mine <sup>a</sup>	Coal seam	Principal market	Scheduled year of full capacity	Capacity at full operation (million tons)	1978 production (million tons)
AMAX Coal Co.								
Delta	Crab Orchard	Saline	S	Herrin (No. 6)	Steam	Expansion 1980	2.40	--
Wabash	Near Keensburg	Wabash	U	Harrisburg (No. 5)	Steam	1980	3.60	1.83
Inland Steel Co.								
Inland 2	Near McLeansboro	Hamilton	U	Harrisburg (No. 5)	Metal-lurgical	1984	2.50	0.05
Midland Coal Co.								
Rapatee	Near Middlegrove	Fulton	S	Springfield (No. 5)	Steam	1981	1.10	0.48
Monterey Coal Co.								
Monterey 2	Near Albers	Clinton	U	Herrin (No. 6)	Steam	1982	3.60	1.30
Morris Coal, Inc.								
Morris 5	Crab Orchard	Williamson	U	Harrisburg (No. 5)	Steam	1981	1.00	0.31
Old Ben Coal Co.								
No. 25	Near Thompsonville	Franklin	U	Herrin (No. 6)	Steam	1980	4.00	1.11
No. 27	Marissa	Washington	U	Herrin (No. 6)	Steam	1981	1.25	0.54
Peabody Coal Co.								
Marissa	Near Harco	Saline	U	Herrin (No. 6)	Steam	1981	1.20	0.33
Western Fuels Assoc.								
Brushy Creek Mine								

<sup>a</sup>S = surface; U = underground.

capacity of 25,000 short tons. This product was used as an abrasive, as refractory material, and in metallurgical applications.

#### Metals and other minerals

Lead, zinc, barite, and small amounts of silver were recovered as by-products of Illinois fluorspar production in 1979. The total value of metals mined was 17.3 percent lower than the 1978 value; the value of barite decreased 64.1 percent from the 1978 level.

Illinois peat production in 1979 rose to 86,000 tons, which represented a value of \$1,610,000. In 1979, fluorspar—the gemstone mined in Illinois—contributed approximately \$15,000 to the total value of mineral materials mined.

#### Mineral materials processed

Preliminary data are not yet available for all the mineral materials processed in Illinois in 1979; however, we do

know that sulfur decreased 3 percent in quantity, but increased 5.1 percent in value. Expanded perlite decreased 15.6 percent in quantity and 5.9 percent in value. Ground barite increased 35.2 percent in quantity and 5.6 percent in value. Illinois producers sold 41,414 tons of iron oxide pigments valued at \$22.4 million—an increase of 25.9 percent in quantity and 16.8 percent in value from 1978. According to the American Iron and Steel Institute, Illinois raw steel production declined in 1979 to 11,729,000 tons, a decrease of 5.6 percent from the level in 1978 of 12,424,853 tons. United States Steel Corp. at Chicago, Illinois, reported closing its ingot mold foundry in 1979.

#### Mineral products manufactured

Of all the mineral products manufactured in Illinois in 1979, preliminary data are available only for cement and lime. Portland cement (1,669,000 tons) experienced a 21 percent decrease in quantity and a 9.1 percent decrease in value (to \$72,902,000); masonry cement increased 16.5 percent in tonnage and 34.5 percent in value. Lime decreased 9.3 percent in quantity and 3.1 percent in value.





